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THE GEOGRAPHICAL MAGAZINE

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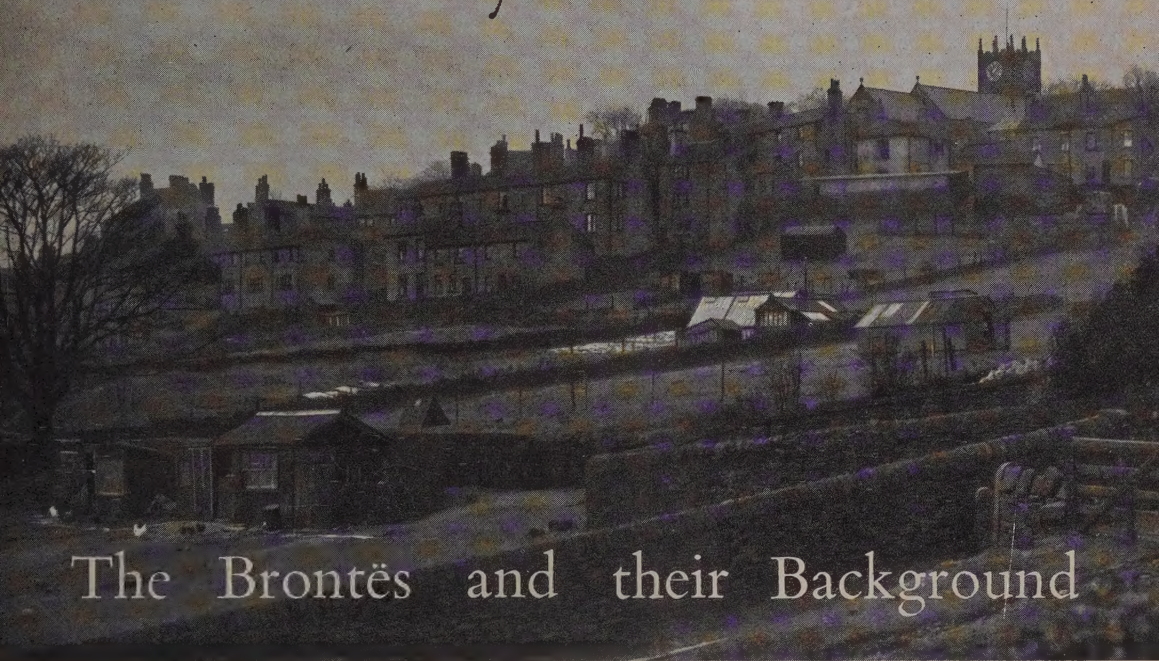
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The Castaways



The Brontës and their Background

by ROY FULLER

"The dreary black-looking village of Haworth"

Val Doe

In May 1846 appeared a slim volume, Poems by Currer, Ellis and Acton Bell, the first publication of the Brontës. The centenary is a fitting occasion to estimate how much—or how little—their writing was influenced by the scenes among which so much of their lives was passed

MRS GASKELL (who lived not too inconveniently at Manchester) made several visits to Haworth. To her own unemotional (and occasionally humorous) descriptions of it she adds, in her biography of Charlotte, this from a letter written by a neighbour of the Brontës about a visit in 1850: "The rain ceased and the day was just suited to the scenery,—wild and chill,—with great masses of cloud glooming over the moors, and here and there a ray of sunshine covertly stealing through, and resting with a dim magical light upon some high bleak village; or darting down into some deep glen, lighting up the tall chimney, or glistening on the windows and wet roof of the mill which lies couching in the bottom. The country got wilder and wilder as we approached Haworth; for the last four miles we were ascending a huge moor, at the very top of which lies the dreary black-looking village of Haworth. The village-street itself is one of the steepest hills I have ever seen. . . . At the

top was the inn where we put up, close by the church; and the clergyman's house, we were told, was at the top of the churchyard. So through that we went,—a dreary, dreary place, literally paved with rain-blackened tombstones, and all on the slope, for at Haworth there is on the highest height a higher still, and Mr Brontë's house stands considerably above the church. There was the house before us, a small oblong stone house, with not a tree to screen it from the cutting wind. . . ."

Already—Mrs Gaskell's brilliant *Life* was published only two years after Charlotte's death—Haworth and its parsonage were beginning to assume their legendary undertones. "Here", noted a 19th-century lady in her diary, "live the Misses Brontë, daughters of the parson. . . . What gloom! How lonely! In this desolate place what thoughts other than those of a melancholy nature could inhabit the breasts of females!"

Subsequent writers about the Brontës, less naïvely but similarly, have all found a significance in the place where this odd family lived: as though by examining the distance of the parsonage from the moors or from the graveyard or from the Black Bull, or by ascertaining the truth about its sewerage system or its temperature in winter, or by finding out precisely where Emily took her walks, or by looking at the contents of her desk, they could 'explain' *Wuthering Heights* or *Jane Eyre*. Certainly the history of Haworth Parsonage, from 1821 to 1849, could have furnished the material for a plot as wild and pathetic as any Brontë might have invented: the death of Mrs Brontë, and then of the children, Maria and Elizabeth; the eccentricities of Mr Brontë; Emily punching her own dog's face, cauterizing the bite from another; the immense and astonishing literary activity; Branwell's involved business and amorous affairs, and his dissipation and death; Emily's horrible last illness; the dying Anne setting out for Scarborough—to mention only the most dramatic events.

I think there is, in the case of the Brontës, some justification for reading their work against their personal background, though there have been speculations on too few facts and a concentration on their lives of a slightly

hysterical and, in the main, deplorable nature. The important thing about them is that their work marks the first break-away of serious English fiction from a wide social basis. In the Brontë novels the characters work out their emotional problems isolated, to a large degree, from the world of a morality based on property relations.

Emotion, in fact, is all-important, and the values of the Brontë morality are based on the validity and intensity of feelings. The material foundations of life are kept to a minimum. Jane Eyre and Agnes Grey, for example, are governesses; the hero of *The Professor* is a school-master; *Wuthering Heights* has few characters, and although some of them are engaged in farming, that fact is not very apparent from the text. Even, to take a small but meaningful instance, food—which plays such a large part in Dickens—in the Brontë novels consists only of porridge or dry bread or a glass of milk.

In order to effect this step in the development of English fiction it was highly convenient, therefore, that the talents of the Brontës should have been confined in a remote northern village. For the fact that they added emotional scope to the novel does not mean that they made it less real, in the sense of disengaging emotion and people from places





Val Doone

(Opposite) *The Black Bull public house at the top of the village street was a haunt of Patrick Branwell Brontë when he was at Haworth: "He will do nothing," wrote Charlotte in a letter, "except drink and make us all wretched". Close by is the church (above), and the grave-yard where he and all the Brontës, save Anne, were buried*

and things. They made it more real; just as Wordsworth and Coleridge made poetry more real though their work was the beginning of a 'Romantic' revolution. Like Wordsworth, the Brontës felt that there was a deep, spiritual connection between man and nature, and their use of nature, like his, has accordingly an added significance.

The Brontës knew very few places. Emily, Charlotte and Anne were all born at Thornton where their father was curate, but moved the few miles to Haworth—which is in the West Riding of Yorkshire, three and a half miles south-west of Keighley—in their infancy. Charlotte and Emily, when they were little girls, went to a school at Cowan Bridge in Lancashire, a school which served Charlotte as the model for Lowood in *Jane Eyre*. Later, all three girls attended a school at Roe Head, about twenty miles from Haworth, which subsequently (while Charlotte and Anne were still there) removed to Dewsbury Moor.

Emily taught for six months at a school in Halifax called Law Hill. Charlotte and Anne had one or two situations as governesses.

In February 1842 came Charlotte and Emily's momentous journey to Brussels. By November they had returned to Haworth. Charlotte went again the following January, but stayed only a year. Haworth drew these girls back like a magnet. After the publication of *Jane Eyre*, *Wuthering Heights* and *Agnes Grey* in 1847, Charlotte and Emily visited London. Emily died at Haworth in 1848, Anne at Scarborough the year after. Charlotte survived until 1855, and went to London again on several occasions, even being lionized, but of the two novels she published after her sisters' deaths, *Shirley* is about Yorkshire and *Villette* about Brussels. It is clear that to all these places the sisters were exceptionally sensitive: journeys, even the childhood visit to a Derbyshire school friend, were always thought of as highly significant and revelatory.

Connected, surely, with this feeling was the compensation which the Brontë girls and boy gave themselves for the sparsity of their contacts in Haworth by making, with an elaboration extraordinary even for lonely children, two imaginary worlds. Charlotte and Branwell invented and wrote about a fictitious country which they called Angria, Emily and Anne about another called Angora. The elder pair grew out of Angria, but Emily and Anne wrote about Angora and its inhabitants, the Gondals, until Emily's death, and Emily's Gondal poems form an important part of the literary output which has survived her.

There is no overt trace in Emily's work of either her London or Brussels visit. *Wuthering Heights*, her only novel, has the unity of place of a classical tragedy (and a further resemblance, too, in the tight, complicated inter-relation of its characters). The scene of the whole of this masterly story is laid in two houses, Wuthering Heights and Thrushcross Grange, and the few miles of moor between them. The moor, in its seasonal changes, provides a background and a commentary on the inhabitants of the houses as they journey between them on their errands of passion and

vengeance. The attempts to identify Wuthering Heights and Thrushcross Grange with actual Yorkshire houses provide typical examples of what I cannot but regard as largely misplaced ingenuity of research in the Brontë canon. Whether Thrushcross Grange is Ponden Hall, or whether Wuthering Heights is Law Hill School or High Sunderland Hall, is irrelevant for at least one reason, and that is because the fiction really needs no such adventitious aids to verisimilitude. The world of *Wuthering Heights* is, in one sense, as imaginary as the world of Angora, but it is characterized by a strong realism: the accuracy with which Emily Brontë depicts the passions of her characters is paralleled and deepened by the accuracy of her descriptions of their environment. "Wuthering Heights", she writes, "is the name of Mr Heathcliff's dwelling. . . . Pure, bracing ventilation they must have up there at all times, indeed; one may guess the power of the north wind blowing over the edge, by the excessive slant of a few stunted firs at the end of the house; and by a range of gaunt thorns all stretching their limbs one way, as if craving alms of the sun."

It is with touches like this and not with set-pieces of description (such as Charlotte is inclined to give) that she gains her effect. Indeed, it is difficult to find so much consecutive description of nature to quote from *Wuthering Heights*. One reason, surely, for this style of Emily Brontë's, in which people, emotions, rooms, furniture and nature are organically combined, is the complete familiarity with the scenes from which she made the background of her story, and the absence of other scenes in her life to distract her.

The same assimilation can be seen clearly in her verse, where isolated, particular de-



(Opposite) *The Parsonage in the time of the Brontës, and (left) the view of the church as seen from the living-room window. "The Crowded grave-yard surrounds the house and small grass enclosure for drying clothes." (Mrs Gaskell in her Life of Charlotte)*

Val Doone



Rischgitz Studios

scriptions of nature exist usually only in fragmentary poems:

'Twas one of those dark cloudy days
That sometimes come in summer's blaze,
When heaven drops not, when earth is still,
And deeper green is on the hill.

or:

What is that smoke that ever still
Comes rolling down the dark brown hill?

In the finished poems, the sun, the snow, the hills, the moors, are used in a more symbolic way. Though rarely perfunctorily: behind the conventional forms lurk not only the original sharp view of their user, but also the Presences, which, although not consoling or explanatory, give life—that uncomfortable, commonplace, painful, intense life at Haworth—its justification:

Silent is the house: all are laid asleep:
One alone looks out o'er the snow-wreaths deep,
Watching every cloud, dreading every breeze
That whirls the wildering drift, and bends the
groaning trees. . . .

Burn, then, little lamp; glimmer straight and
clear—

Hush! a rustling wing stirs, methinks, the air:
He for whom I wait, thus ever comes to me;
Strange Power! I trust thy might; trust thou my
constancy.

Whenever Emily left Haworth she became physically ill. "My sister Emily loved the moors," Charlotte said. "Flowers brighter than the rose bloomed in the blackest of the heath for her;—out of a sullen hollow in a livid hillside, her mind could make an Eden. She found in the bleak solitude many and dear delights; and not the least and best-loved was—liberty. . . . The change from her own home to a school, and from her own very noiseless, very secluded, but unrestricted and unartificial mode of life, to one of disciplined routine. . . . was what she failed in enduring." Emily Brontë was an early example of that class of writers which appeared with the rise of industrialism; writers who show, not only in their work but in their strange and febrile lives, the incompatibility of their ideals with the civilization they are born into: in their work by the construction of a new, heightened world of their own; in their lives by their obsession with *places*—their long travels or their long solitudes. Rimbaud, D. H. Lawrence, some of the English 'nineties poets, the Americans, Emily Dickinson, Poe and Hart Crane—such names spring to the mind. Rimbaud went to Africa, Lawrence to Mexico and Australia, to escape a culture and a way of life they thought deathly. Emily Brontë, an early-Victorian girl, could see no





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A sketch of Anne by Charlotte, said by Charlotte's husband to be an admirable likeness



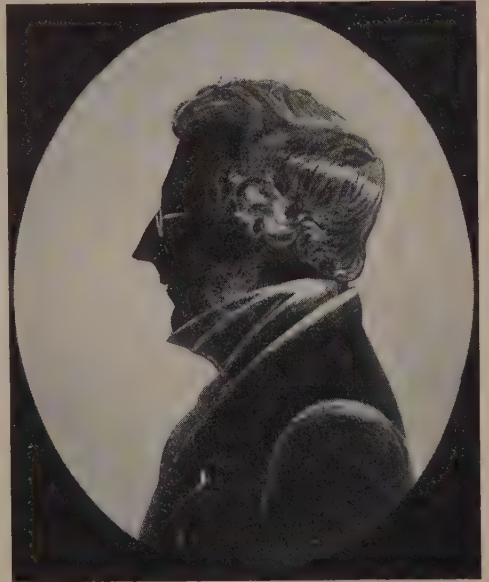
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Emily by Branwell. "One of her rare expressive looks was something to remember through life"



Rischgitz Studios

Charlotte: "A tiny, delicate, serious, little lady, pale, with fair straight hair, and steady eyes"



Rischgitz Studios

Branwell's silhouette. The clothing, Clement Shorter said, makes him look older than he was

(Opposite) *The track from Lower Withins "through heath and mud to Wuthering Heights"*

larger freedom than Haworth, where at least she was out of the impersonal machinery of wage-earning, where she could write, where no one cross-examined her, and where, in the Yorkshire moors, bare though they were, she could find the spiritual forms that she so valued.

The distinction between Emily's character and work and Charlotte's is perhaps not made often enough: there is a natural tendency to speak generally of 'the Brontës'. But it seems to me that Charlotte, without the strong personalities of her family, and without Haworth—placed, for example, in the material circumstances of Mrs Gaskell—would (unlike Emily) have been a much less revolutionary figure in English fiction. She would not, of course, have failed to bring a new naturalism and flexibility to the novel, and a fresh eye for personal relationships, but a great deal of the violence and romanticism in her work arises from her largely thwarted ambition and her desire for love. It is Haworth, again, which

exercises its influence—its isolation, lack of society, and its inability to equip the girls for anything more than the lives of governesses. Haworth, too, and the other inclement parts of Yorkshire which Charlotte knew, give a book like *Jane Eyre* much of its *tone*—a tone which might be lacking were the scene laid, say, in George Eliot's Warwickshire:

"It was . . . not positively rainy, but darkened by a drizzling yellow fog; all underfoot was still soaking wet with the floods of yesterday. The stronger among the girls ran about . . . but sundry pale and thin ones herded together for shelter and warmth in the veranda. And amongst these, as the dense mist penetrated to their shivering frames, I heard frequently the sound of a hollow cough."

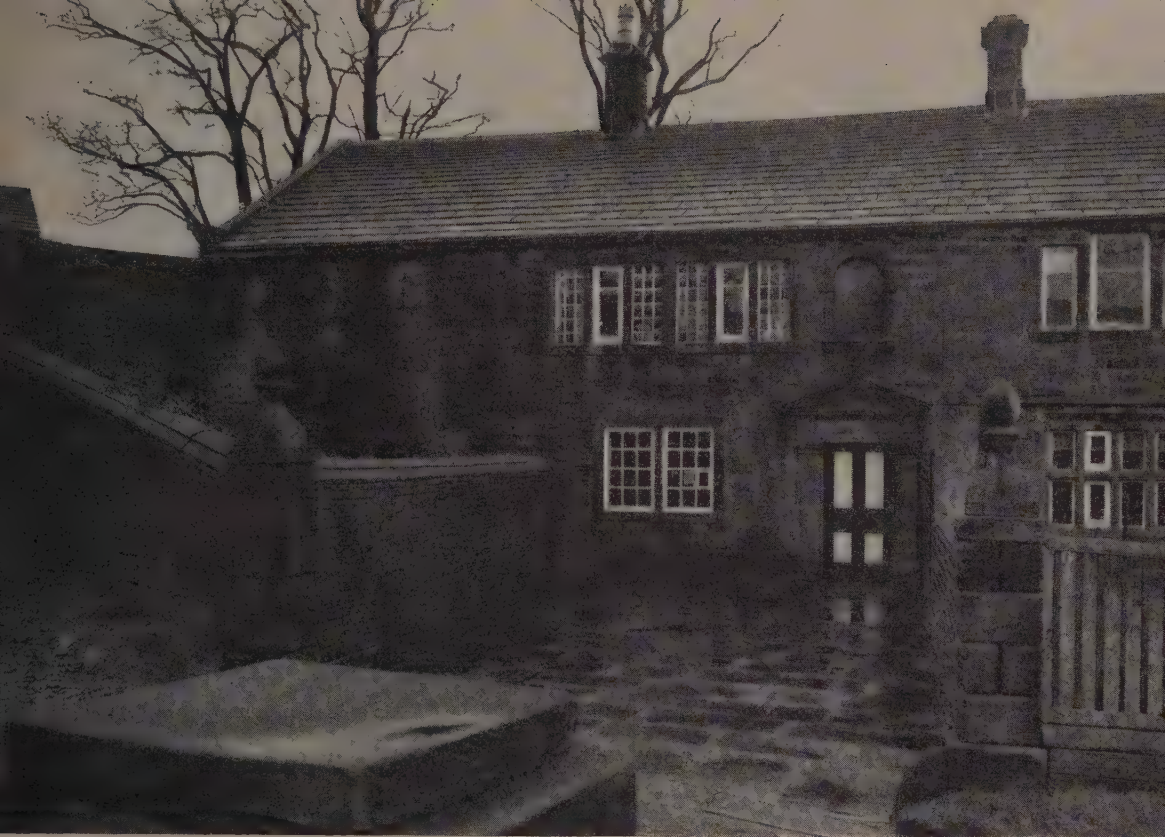
and:

"At the close of the afternoon service we returned by an exposed and hilly road, where the bitter winter wind, blowing over a range

High Sunderland Hall, Halifax, said by many to be the source of Wuthering Heights. "Before passing the threshold, I paused to admire a quantity of grotesque carving lavished over the front"

Val Doane





Val D.

Ponden Hall, Stanbury, generally accepted as the original of Thrushcross Grange in Wuthering Heights. Rebuilt in 1801, it was therefore still a comparatively new house when Emily knew it

of snow summits to the north, almost flayed the skin from our faces.” and:

“To this house I came, just ere dark, on an evening marked by the characteristics of sad sky, cold gale, and continued small, penetrating rain. . . . Even when within a very short distance of the manor-house you could see nothing of it, so thick and dark grew the timber of the gloomy wood about it. Iron gates between granite pillars showed me where to enter, and passing through them, I found myself at once in the twilight of close-ranked trees.”

Note the strong ‘Haworth’ words—frames, flayed, penetrating; typical of Charlotte’s prose.

It is significant that the stay in Brussels—which, as I have said, gave nothing to the machinery of *Wuthering Heights*—forms the basis of two of Charlotte’s four novels, and in *The Professor* especially, Charlotte’s eager

gobbling of the new experience for the purpose of her fiction is very apparent.

“I’d recommend you to travel,” says Hunsden to the hero, William Crimsworth, on an early page.

“God knows I should like to go!” replies Crimsworth.

“What the deuce hinders you? You may get to Brussels, for instance, for five or six pounds.”

And, of course, it is to Brussels that Crimsworth goes.

Yet even in Brussels the old Haworth inhibitions are there. There is very little of the Belgian capital in either *The Professor* or *Villette*, not because Charlotte does not wish to put it there but because, a teacher at the Pensionnat Heger, she knew so little of it. The journey from Ostend to Brussels, a visit to a theatre, the park at night—a few such things are described with Charlotte’s usual brilliance and detail. One can almost see from these



Val Doone

The Brontë Bridge, Sladen Beck, Haworth Moors. One of their old friends said that for the Brontës "The rugged bank and rippling brook were treasures of delight"

place, with whatever personal relationships, she could probably have only created for herself more Haworths.

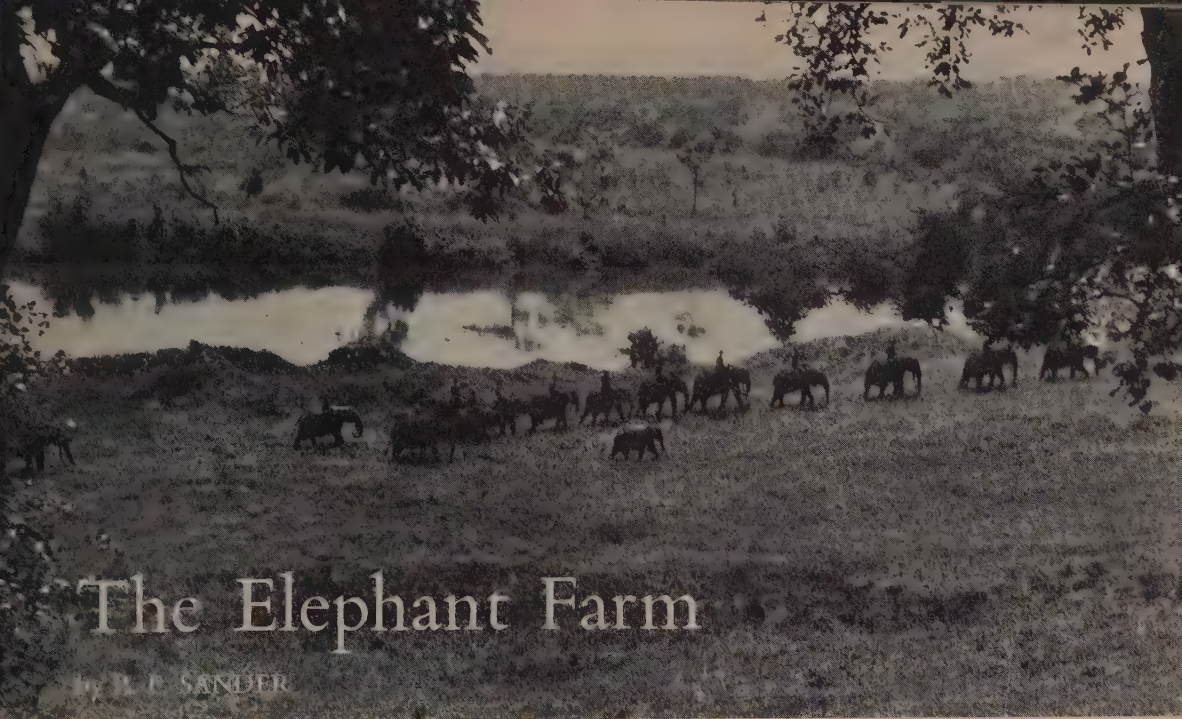
A favourite poem of the Brontës, and one to which they attached a great private significance, was William Cowper's *The Castaway*. Already, at the end of the 18th century, Cowper was one of those figures in literature of whom I have spoken, who found contemporary civilization pathologically distasteful (his attempts to deal with ordinary life are not dissimilar to those of Franz Kafka), and *The Castaway*, describing a seaman swept from a ship in a storm, and inevitably left to drown as the ship and his luckier comrades sail on, is an elaborate metaphor for his own situation. One feels that the *places* of the Brontës' lives have a good deal to do with the sense they shared with Cowper that they were torn from ordinary life and isolated, struggling, in a

two books precisely what she did in Brussels.

But truth, the felt experience, is what characterizes all the Brontë writing (even Anne's, who, with an imagination less powerful than her sisters', was still more tied to her little world), and what Charlotte *really* knew about Brussels was the topography of the school at 32 Rue d'Isabelle where she taught, and the emotional conflicts of its inhabitants. The schools in the two Brussels novels are just as much closed, individual systems as Thornfield (in *Jane Eyre*), as Wuthering Heights or Thrushcross Grange—or Haworth.

There is greater freedom in *Shirley* and *Villette* than in *The Professor* and *Jane Eyre*, and it would have been highly interesting if Charlotte had had time to have written another novel with her London experiences, and the experience of her marriage, digested. Though no doubt it is idle to speculate: the pattern of her neurosis was firmly set: in any

strange and wild element—though, of course, the reaction is mutual; their lives and art, both so fragmentary and so suggestive of more than they express, transform their places, and call out the evocative and romantic adjectives from visitors to the unpicturesque Haworth; give the dingy Black Bull, where Branwell drank too much, its mysterious undertones; make the infertile northern heath blossom with "flowers brighter than the rose". Biography is not so distinct from geography as the cleriheew makes out. And, since a novelist's scene cannot be wholly invented, geography (or, rather, topography) has also a peculiarly direct effect on fiction; particularly in the Brontës' case, where the stone wall, or the path over the moor, or the alley along the side of a Brussels school, are invested with as much emotion and significance as their contemporaries show for whole cities and counties.



The Elephant Farm

by R. E. SANDER

All photographs by the Author

Gangala-na-Bodio, the only elephant farm in Africa, is situated amid savannah bush country in the north-east of the Belgian Congo. In this region and in the southern Sudan are found the largest elephant herds in the world; and here, in the face of many doubts and difficulties, the Belgians have succeeded in domesticating the African elephant by the methods described in the following article

ELEPHANTS were familiar to the ancients of the Mediterranean as beasts of war. But where did they come from? They were first seen in Italy early in the 3rd century B.C., when the Romans found these "Lucanian cows", as they called them, a most formidable part of the armament brought over by Pyrrhus, king of Epirus, to the support of the Greeks in Lucania. In 218 B.C. came Hannibal the Carthaginian, whose forces on reaching the Rhône included thirty-seven elephants. To get them across the deep, swift-flowing river, he adopted the ruse of building earth-covered rafts as a continuation of piers protruding into the stream, onto which the nervous creatures could be enticed. When, however, the rafts were set in motion, some of the elephants plunged into the water and (says Polybius) "their Indian riders were drowned".

This statement lends itself to speculation. Were the elephants Indian too? There is good authority for supposing that they were not, and that the elephants used by the Carthaginians were African, as were those domesticated earlier in Egypt by Ptolemy Philadelphus with the help of Indian trainers. In any case, the training of African elephants

was abandoned after the fall of Carthage and Rome, to be revived only in our own day, in the Belgian Congo.

The first attempt at revival renewed the connection with India, where elephants have been domesticated since time immemorial. It was King Leopold II, then Duke of Brabant, who had the idea of introducing Indian elephants in order to create a training station in Central Africa, with the hope of utilizing an untapped resource in the way of transport animals, and one which the tsetse-fly would not affect. His efforts resulted in the departure from Dar es Salaam, in July 1879, of a caravan including four Indian elephants. Within a year all were dead.

Twenty years later a second attempt was more successful. This time, having heard of a young elephant tamed at a Catholic mission in French West Africa, Leopold II sent a certain Major Laplume of his colonial service to investigate the matter. The report encouraged him to entrust Laplume with the task of starting a training station in the north of the Belgian Congo. Laplume began with no experience whatever, save that of a hunter, and learnt as he went along. By the end of 1900 he had captured seven young elephants



The elephants are captured at from ten to fifteen years old. They then measure about 1.50 to 1.80 metres high; a full-grown male of the variety most suitable for training may reach three metres at the withers. At first, while being schooled, the captives are attached to 'monitors'—the older tame elephants on whose influence the rapid domestication of the young wild ones largely depends

—too young, for they all died. In 1902 he had succeeded in training three; in 1907 the establishment comprised 25 elephants. It had already been moved once; and in 1927 it was finally transferred to Gangala-na-Bodio on the river Dungu. That year the Government began selling, or more usually hiring out trained elephants for work in various enterprises. In the years 1942-4 the total number of elephants under the control of the administration was about 70, including from 20 to 30 hired out for forest exploitation, plantation work or public service in the colony. Of those at Gangala-na-Bodio itself in 1944, 15 were 'monitors' (among them a

veteran captured in 1902) and 17 under training; 25 young elephants were captured that year, 40 in 1945 and 29 in February of this year.

Gangala-na-Bodio, the only elephant farm on the African continent, is situated in a remote and rather lovely spot on a rise overlooking the winding river Dungu. It lies in the centre of an immense stretch of savannah bush country well populated with elephants; the Garamba Reserve to the north covers about 1900 square miles. At the time of my visit Mr Louwers, the officer in charge, had about fifty elephants under his care. My first sight of them was when they

were being rounded up for their daily bath, which takes place at five in the afternoon and which they evidently enjoyed, disporting themselves like a lot of children. Each elephant was mounted by its own *mahout*; and these showed marvellous agility in adhering to the elephants' backs while they went deeper and deeper into the river until practically submerged, allowing themselves meanwhile to be thoroughly scrubbed. When the bath was finished the mahouts, prodding their beasts with the stick terminating in a pointed steel hook which each of them carries, drove them homewards to be stabled for the night in their open-air sleeping place. It did not take very long for all the elephants to be chained down, one chain being attached to the off foreleg and another to the near hind leg. The routine of the farm is conducted with military regularity: at exactly a quarter to six, to the sound of a bugle, boys appeared with the elephants' supper consisting of large bundles of leaves, branches and 'mealies'.

Night had fallen as I left with Mr Louwers. He and his wife, the only Europeans in the



Stanford, London

place, made me very welcome. After supper he told me more about the elephants and how they were captured. The territory around Gangala-na-Bodio is ideal for hunting elephants as it is covered with bush savannah and cut by open marshy rivers. Forests are rare. The dry season is from January to April; and the best months for capturing the

After eight months or more of schooling some of the young elephants are docile enough to be detached from the monitors and given further instruction in groups, along with their contemporaries. Each has its own mahout (to use the Indian word) dressed in dark blue cotton shirt and shorts and carrying a stick with a pointed steel hook at the end (the Indian ankus) for guiding the elephant





The young elephants thoroughly enjoy their daily bath, spurning water about with their trunks and going deeper and deeper into the river until practically submerged. The mahouts, still mounted, look as if they are standing on the surface of the water while they give their charges a good scrub

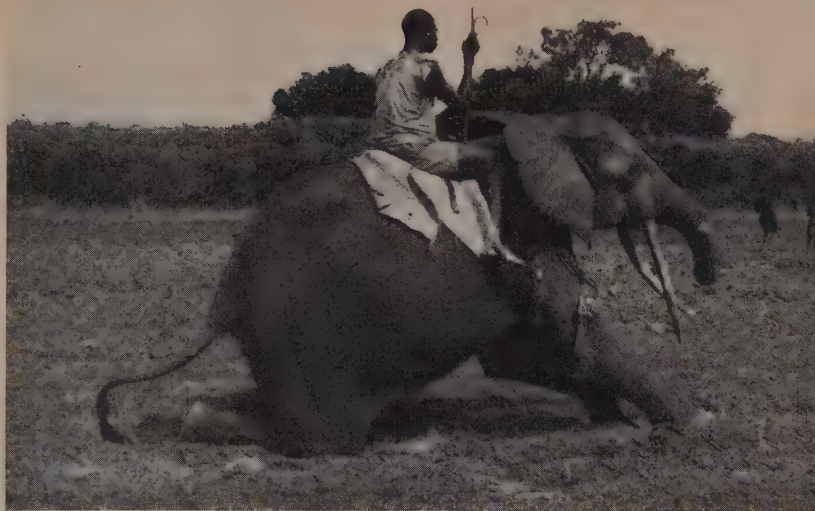
wild elephants are February and March when the high grass is greatly reduced by bush fires and the rivers are at their lowest ebb. The elephants are hunted on horseback and on foot, and captured in the open country by the use of ropes and the firing of guns. The Keddah or Indian method of driving a herd into the interior of a burning palisade is not used in the Congo as it is a very costly business. Elephants can be encircled without firing a shot, but generally the signal for attack is a short burst of fire which puts the sighted elephants on the move. Then hunters under the protection of gunners run out as near as possible to the elephants and catch the tail of one of the last of the frightened herd, while with yells others put ropes around his hind legs. This is dangerous work and the natives doing the job need all their wits about them; in fact the hunters are put through an extensive training, part of which is designed to keep them alert and fit. The roping of the elephant is carried out where there are some trees near by to which the ropes are firmly secured. After precautions have been taken to ensure that the captured elephant cannot get away, two of the older tame ones—the 'monitors'—are brought along. Then the wild elephant is tied between them and taken back to the station.

The elephants thus captured are from 1·50 to 1·80 metres high and from ten to fifteen years old. They are therefore neither so big as to be difficult to train nor so young as to be unable to survive without their mothers; and they do not have to be maintained too long before they can be put to work. Con-

trary to common supposition, the African elephant is usually an apt and docile pupil; but his schooling takes at least eight or nine months and requires great energy and patience. The technique used was learnt for the most part from Indian mahouts whom the Government imported and who taught to certain Africans selected for the purpose an art practised in Asia for many centuries. Amongst other things they taught them the 'elephant language', which the animals only understand when it is spoken in a certain tone of voice.

The methods employed in the Belgian Congo involve rewards and corrections, kindness and a careful measurement of effort, since the elephant is a delicate creature despite his robust appearance. For a long period the pupil is schooled at a tether with the help of the monitors. After about a month's captivity he learns to tolerate the approach of man, and in particular of the man who is to be his mahout. The method is an Indian one: regularly, morning and evening, a group of men surround him and sing a traditional chorus while for a quarter of an hour he is rubbed down and made much of, being given sweet potatoes, bananas, pineapples or sugar-cane. Then one day he is mounted and remains so while the song continues and the sweetmeats are eaten. Towards the end of the second month he is taught to lie down and rise again at the word of command; all four legs are shackled and by a combination of gentle tension and pressure he is brought to lower his 'elbows' and 'knees' to the ground. He also learns to

Each elephant, when fully trained, has learnt to lie down, rise, stand and turn at the command of his mahout. These men, drawn from the Zande tribe which inhabits the area round the farm, are hunters from birth and possess unusual insight into the ways of animals



Having reached a suitable height and stage of training, the elephants are taught to pull various farm implements and finally settle down to regular work. They work about five hours a day, from six to eleven a.m. Two elephants can pull a four-share plough and cover the ground as fast as a tractor



pick up objects and pass them with his trunk to the mounted mahout; sometimes he is first induced to make the correct movement by his desire to get rid of a fibre ball which the mahout dangles on the end of a string alongside his trunk. At every stage he is rewarded, when he has learnt his lesson, with something good to eat and given a short rest. After some five months of captivity he begins schooling on the move along with his fellow pupils, each attached to a monitor who constrains him to walk forward, stop, back and turn, while the mahout gives the appropriate sign with his hooked stick. Finally the pupils are detached from the monitors and these act only as leaders of a group.

The foregoing description applies to the methods of schooling used at Gangala-na-Bodio until quite recently. I understand, however, that the present Director has adopted a new method which involves allowing the young animals to roam at liberty in an enclosure bounded by ditches. It is hoped in this way to reduce the number of deaths among them.

His schooling ended, the elephant spends five or six months learning to work—to pull and to carry—the effort demanded being increased by regular stages. All the animals in training are put through this apprenticeship once they have reached a suitable height (about 1.70 metres), regardless of how long they have been in captivity. When learning to pull, the pupil passes from bits of light wood to a tree-trunk, to a harrow or roller, and finally to a cart or plough. Carrying is easily proportioned to growing strength, as each elephant brings his daily ration of forage back from the pasture, a section of wooded savannah near the farm, where the elephants

spend the middle of each day. The section is allocated for one day only and then changed, so as to avoid over-grazing and the destruction of trees.

At last the elephant is ready to be sold or hired out; and there is no lack of demand for his services, for while motor transport has largely solved the problem which Leopold II originally had in mind, the elephant can play a most useful part in agriculture, in forestry and in public works. While he can only carry comparatively light loads, he can pull up to two tons on flat ground, applying his great weight with slow, relentless force. Two elephants can pull a four-share plough and cover the ground as fast as a tractor; while they have a special aptitude for drawing a straight furrow. On newly cleared soil they have a further advantage over the tractor, for if they feel a stump or a stone they will stop, when a tractor would break or buckle the plough. In forest regions where the horse or the ox would succumb to the bite of the tsetse-fly, the elephant is immune.

But he needs good treatment: plenty of the right food, regular care and suitable hours of work—not during the heat of the day, when he must be allowed to rest in the shade. Above all, those who know the African elephant well say that he is very impressionable, even timid; that he must not be surprised or roughly handled; and that the men who deal with him must remain calm in all circumstances. The elephant farm of Gangala-na-Bodio has proved that, given such treatment, the African elephant is capable of winning a reputation in the works of peace no less renowned than that which he won so long ago in war.



Colour Photography for Geographers

by D. A. SPENCER

Having surveyed, in our March number, the equipment most useful to geographers for black-and-white photography, Dr Spencer shows that they can now obtain, with the same equipment, inexpensive colour transparencies capable of great enlargement in reproduction. Photographers intending to use colour material outside Great Britain will benefit themselves and us by communicating with our Art Editor

COLOUR photography is now practical by a number of different systems. All depend on analysing the light reflected by the subject into its red, green and blue components, recording these separately and subsequently recombining appropriately coloured positive records for presentation to the eye. When the subject-matter is a still life three separate photographs can be made, and this is the method by which process engravers prepare colour-printing plates from colour originals. Living subjects require that all three records be made simultaneously, and so-called one-shot cameras in which light entering the lens is divided optically between three plates at three different stations are still widely used in the studio by professional photographers. In field work such methods are of limited use and present considerable difficulties.

The scope of colour photography was immensely increased by the introduction of methods which enabled colour transparencies to be made in conventional hand cameras. The earliest of these systems—in which the three records are made on one emulsion through a mosaic of microscopic colour filters—still survives in the form of the additive 'Dufaycolor' process. When a contact size transparency is all that is required and the photographer wishes to process his exposures in the field, the Dufaycolor process is of value. However, the fact that the image is built up from a mosaic of colour elements, small though these are, limits the acceptable magnification and the resolution of fine detail. More recent methods of making colour transparencies with conventional cameras employ a so-called integral tripack film. 'Kodachrome', the only film of this type at present available on the English market, yields continuous-tone, grainless colour transparencies which can be enlarged without loss of detail to any magnification which would be acceptable from a fine grain black-and-white negative. The emulsion of Kodachrome

film consists of three separate layers, each of which records one only of the red, green and blue primary components. The exposed film is developed to a negative and then chemically reversed to a positive colour transparency. During this process, accomplished by special processing baths in which the silver image is removed, the final picture is built up from three superimposed dye images.

Kodachrome is available as 35 mm. film for miniature cameras, as substandard cine film and as cut sheet film. Although the larger sizes present simpler problems to the blockmaker and make effective display material or lantern slides, from the traveller's point of view the miniature size film presents advantages as regards weight, flexibility of equipment and economy. That this size is quite practical for process reproduction is shown by the colour plates accompanying the present article, all of which were reproduced from 35 mm. Kodachrome. It is perhaps worth pointing out that, although in the process of making duplicate colour transparencies from the camera-exposed originals there is a slight loss of colour saturation, excellent black-and-white prints can easily be prepared from the virtually grainless Kodachrome transparencies—even those in which the colour rendering for one reason or another is not satisfactory. The sensible course would thus appear to be to take a supply of colour film for every camera, whatever its size.

CINE FILM

Kodachrome is available as 16 mm. and 8 mm. cine film. The 8 mm. size is primarily intended for personal 'home movies', and the available cameras are of correspondingly simple design. For the 16 mm. size, cameras possessing every accessory used in professional motion-picture making are available and, indeed, several documentary colour films shown in commercial cinemas have been made from 16 mm. Kodachrome originals—



D. A. Spencer

(Above) Hay Tor, Dartmoor. Sunshine behind thin cloud casts only light shadows and is the ideal lighting for colour photography. (Below) Newquay Harbour. Direct sunlight here gives a brightness range greater than can be reproduced on paper. In such cases a contact negative bound in register with the transparency before reproduction reduces the range. This technique was used here



D. A. Spencer



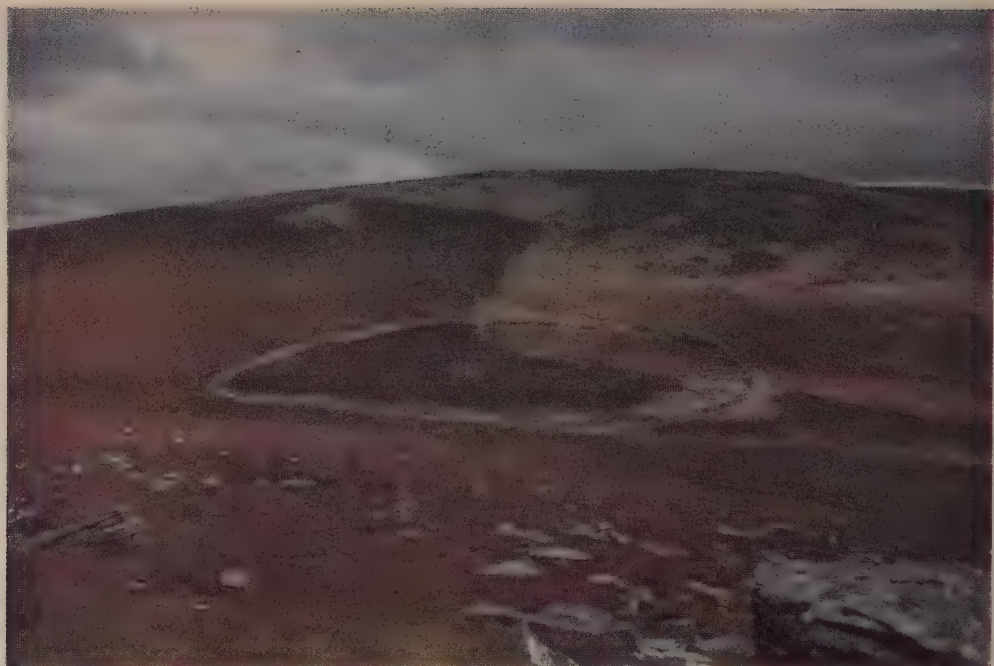
D. McMaster

(Above) *Loch Tummel, Perthshire.* Direct sunlight coming from behind the photographer minimizes the areas of dense empty shadows. Modelling is improved if the sun is somewhat to one side.

(Below) *Haycocks in the Tyrol.* Contre-jour lighting, with the camera facing into the sun, reduces colour saturation. A lens hood and approximately four times the normal exposure are required



D. McMaster



D. A. Spencer

The value of colour reproduction is emphasized by comparison with monochrome records of the same scene. (Above) The circle of stones known as Grims Pound, Dartmoor, possibly the remains of a Neolithic compound, can hardly be distinguished from the moorland background in monochrome prints—



D. McMaster



—taken at some seasons. (Below) Dutch Tulip Field. In the monochrome record half the subject is missing! The brightness range in this subject is very great and a negative was used as a contrast-reducing mask to obtain a good reproduction in the same way as for that of Newquay Harbour





P. L. de Laszlo

The Fighting Lady and *Memphis Belle* being notable examples. In such cases a 'Technicolor' 35 mm. version is made by enlargement from the 16 mm. Kodachrome original.

When 16 mm. duplicates are required from the original film these can be made by contact printing. The original film must be suitably exposed if these duplicates are to be of optimum quality.

PROCESSING IN THE FIELD

The most serious drawback to Kodachrome from the traveller's point of view is that the complex processing operations can only be carried out in specialized plant, and the exposed film must be returned to one of the Kodachrome Processing Stations scattered over the world.

In tropical regions all photographic material should preferably be processed as soon as possible after exposure. In the case of colour film, unsuitable storage before processing may result in noticeable changes in colour balance, and the maker's instructions as

(Left) *Psalliota Arvensis* with a familiar object—in this case a halfpenny—used to give a guide to size. (Below) *Peziza Aurantia*. (Opposite) *The Yucca*, Mt. Wilson, California



P. L. de Laszlo



D. A. Spencer

COLOUR PHOTOGRAPHY FOR THE FIELD BOTANIST

When photographing objects in very bright sunlight, such as the Yucca, the range of brightness exceeds that which can be recorded by the photographic film. The photographer must decide at the time whether to sacrifice the highlights or the shadow detail. In the case of the Yucca the exposure was chosen to give a correct record of the tree—which was the interesting feature—and the exposure of both foreground and sky was inevitably incorrect. When taking extreme close-ups, as of the fungi opposite, either a supplementary lens or an extension collar between the lens and the camera, must be used. The former is preferable as the value of the 'stop' indicated on the camera is not affected

regards repacking exposed film for shipment should be rigidly observed.

During the war, new forms of integral tripack which can be processed by the photographer himself were introduced under the names of 'Ansco-color Reversible Film' and 'Aero Reversal Kodacolor'. A limited amount of Ansco-color is available to American photographers, and Aero Reversal Kodacolor was extensively used by R.A.F. Bomber Command to record the coloured patterns produced by ground marker pyrotechnics which identified the targets in night attacks against Germany. Although at first sight such materials would appear to be of greater interest to photographers working in the field than Kodachrome—for they should permit a constant check on the quality of the photography and in tropical regions eliminate the serious problem presented by proper storage of film between exposure and processing—the advantages may prove illusory.

It is true that the photographer can himself process his Ansco-color or Reversal Kodacolor films immediately after exposure, but the operations involved are numerous and must be carried out under the most carefully controlled conditions if the result is to be acceptable. Unless, therefore, the photographer has access to a well-equipped and temperature-conditioned darkroom, his results may prove inferior to those he would obtain by packing his exposed colour film as carefully as possible and sending it by the quickest route to the nearest processing station.

NEGATIVE INTEGRAL TRIPACKS

A third form of integral tripack is therefore likely to prove of greater importance in the near future. This type is not processed to a positive colour transparency but is merely developed to a negative and fixed. This procedure, which should present no more difficulty in the field than the processing of black-and-white film, yields a negative image in colours complementary to those of the subject. From such negatives colour transparencies or colour prints on paper can be produced at leisure.

Material of this type has been available in America for some time as 'Kodacolor Roll Film'. In this case the exposed film is returned to the Eastman Kodak Company, who develop the colour negative and then print it onto an integral tripack coated paper to produce a positive colour print. The Kodacolor Roll Film process is intended for snapshot amateur photography and in its present form is less suitable for the traveller

than Kodachrome. Experience with this process is, however, paving the way towards the introduction of colour negative material for processing in the field. When he gets back to his own darkroom, the travelling photographer will be able to produce his own colour prints from these negatives by such systems as 'Dye Transfer' imbibition printing, whose working details have just been published in America.

EXPOSURE ACCURACY

It cannot be too strongly emphasized that accurate exposure is a *sine qua non* in colour work. Correct exposure is desirable in black-and-white photography, particularly in miniature camera work, but in an emergency the black-and-white photographer with no means at his disposal of estimating exposure can make three records—one the best guess in the circumstances, one eight times more and one eight times less than this guess—and know with fair certainty that a more or less useful record of some sort will result.

Such latitude is quite out of the question with any colour process, and it is desirable for exposure to be accurate to within half a stop. For important subjects, therefore, even when a reliable calculator or meter is available, it is a good plan to make three exposures, bracketing the estimated correct exposure by plus and minus half a stop. It is worth noting, moreover, that when the eventual object is colour reproduction on paper (either by such processes as 'Carbro' or 'Kodak Dye Transfer' for individual prints or by the printer using photo-mechanical methods) the ideal transparency for the purpose is one that is half a stop under-exposed when judged by the standard required for viewing by lantern projection. This recommendation also holds for 16 mm. cine film from which duplicates are to be made. Gross under-exposures are of course as useless for this as for any other purpose; and although the ideal transparency for reproduction looks somewhat dark—this being the effect of under-exposing colour film—when seen through a normal intensity viewer, the detail in the heavy shadows should be clearly visible.

AVAILABILITY

Of the processes referred to, only 'Dufay-color' and 'Kodachrome' are as yet available in England. Integral tripack material for self-processing and materials for the 'Kodak Dye Transfer' print system will, however, be marketed in Britain as soon as conditions permit.

Roman Britain

by CHRISTOPHER HAWKES

In our April number Dr Sutherland emphasized the influence of the Greek city-state on Roman administrative methods, as defined in the 'principle of urban promotion'. Mr Hawkes shows how incompletely the Romans succeeded in imposing this essentially Mediterranean pattern of civilization on their northernmost province. Therein lies a geographical lesson for all who have a cultural seed to sow: an alien soil will take from even the strongest Empire only what suits its native genius

THE Mediterranean Sea has been called the nursery of western civilization. And the historic unity of the ancient Mediterranean was consummated in the Roman Empire. But Rome found it necessary to push her frontier far inland into barbarian Europe; and Julius Caesar, who first took it to the Rhine, took it also to the shore of a new sea, across which lay the island of Britain. His own venture there (in 55-54 B.C.) marked it down for conquest, following upon his conquest of Gaul, and presently the Romans took up the task. To conquer the whole island proved too much for them, but they subdued the greater part of it: they were here for nearly four hundred years, from the 1st to the 4th century of our era; and those centuries made an epoch in British history whose significance has been much debated. Was it a mere lengthy episode, in which Mediterranean civilization was imposed only to be wiped right out again, in the ensuing Dark Ages of the Anglo-Saxon conquest? Or was it a lasting contribution to our historic development? The question is one of the many that lie behind the problem of our relationship to Europe today, and modern knowledge has made it more than ever interesting to examine. Some of that knowledge comes from the Romans' written history, but modern archaeology has produced much besides.

Now all community of culture between Britain and the Mediterranean did not begin with the Roman Empire. For more than two thousand years before Julius Caesar civilization from the East had been at work, in one way or another, over nearly all Europe, so that the 'barbarian' peoples who confronted the Romans were at least in some degree the heirs of the same cultural tradition as Rome herself. They were backward and wayward and almost all illiterate, but they were not savages; and racially they all had shares in the general European mixture of inheritance. The peoples of Britain were recruited by successive immigrations from the Continent,

culminating in the Iron Age roughly from the 5th to the 1st century B.C. In their material and social culture, religious ideas and Celtic speech they much resembled their Continental neighbours whom Caesar conquered in Gaul. The latest comers indeed were refugees from his conquests there; and



Colchester and Essex Museum

A legionary Centurion of the Roman invasion-force: tombstone of M. Favonius, from Colchester

invaders had settled in the south-east from Belgic Gaul only twenty years before.

Everywhere, from the south coast to north Scotland, the Britons now were cultivators and herdsmen, living in villages or single homesteads upon all the more welcoming soils: the Belgic arrivals of the 1st century B.C., who had heavier iron equipment, could encroach farther upon the woodlands, but the widespread tracts and belts of forest, and of bog, did quite as much as the western and northern mountains to divide the habitable country and narrow its main communications to naturally open trails. Thus the Britons were split into many tribe-groups; and in the later Iron Age, the growth and movement of peoples led to much warfare and insecurity. The chief monuments of that age (though some are rather earlier) are the 'British Camps' or hill-forts, familiar landmarks above all on the chalk and other southern uplands, in the Midland and western limestone country, and in parts of Wales and all along the Marches; rarer in the north, but diversified in Lowland Scotland and elsewhere with many smaller forts and castles, and northward again, with the strange stone towers known as brochs. There was industry and trade in Britain, and a superb art, best known to us from the fine metalwork of the richer chiefs. Merchandise came over from the Continent; and the Belgic south-east, which received most of it, had taken the lead in issuing native coinage. But it was a barbaric island; and its combination of barbarism and wealth, so near their Gaulish doorstep, was certain to bring the Romans in. The death of Cunobelin, the south-eastern high-king, gave them their opportunity. Within three years of it, in A.D. 43, they invaded.

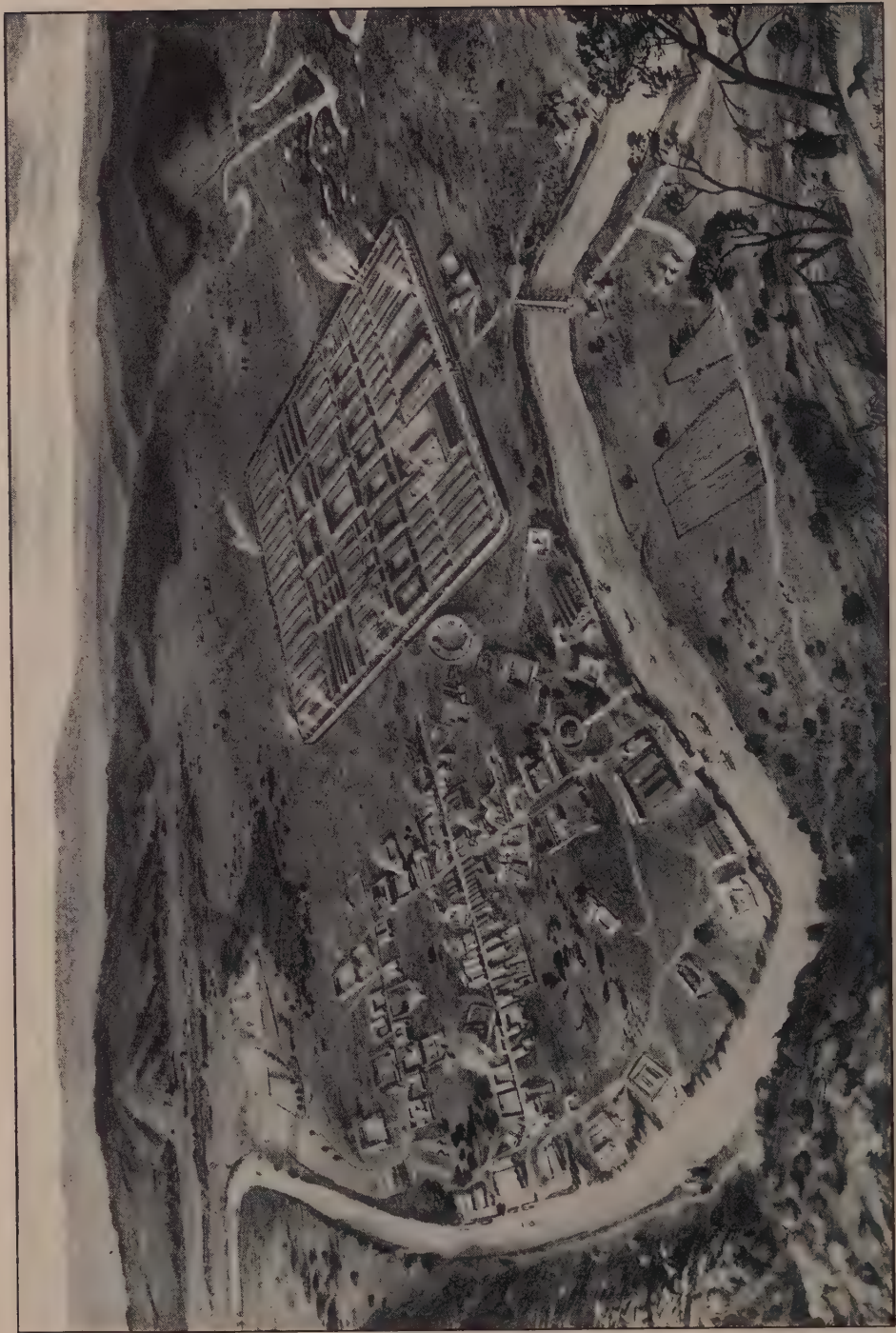
Their general plan was to secure the south-east and advance from it by stages till the whole island should be conquered. They reached the Humber, Trent and Severn quickly, and so came up against the northern hills and Wales, between which they presently thrust through to the Irish Sea. Actually, this was too fast: in 61, while the governor was reducing Anglesey, the south-east revolted in his rear, under Boudicca, the queen of the Iceni (the tribe in Norfolk and Suffolk). There had in fact been some ugly oppression after the early victories, much of it due to the Colony of army veterans set up alongside Cunobelin's old capital at Colchester. The angry rebels sacked both that and the first Roman towns at Verulam (by St Albans) and London, and defeated a Roman legion, so that after they were crushed there was much

damage to repair, both material and moral. But ten years later the offensive was resumed, first in the north and then in Wales; and in 78 a new and great governor, Agricola, wound up the Welsh war and turned to the north again, determined to complete the scheme of total conquest.

Campaign followed campaign: soon he was building forts between the Forth and Clyde, and presently advancing across the Tay into Strathmore. In 84, somewhere in the gate of the Scottish Highlands, he smashed the northern Britons in one final battle, and his fleet sailed on to overawe the broch-dwellers of Caithness and Orkney. The total conquest of Britain seemed as good as achieved. But it remained to turn his success to permanent account, and this the Empire could not spare force enough to do. Its hold on the Highlands was too weak, and even in southern Scotland not enough strength was shown. Before long the Roman garrisons were in trouble, and at last they were driven to general retreat. About 120 the Emperor Hadrian had to come over and replan the whole endeavour.

The backbone of the Roman army was its heavy infantry, the legions, of which Britain now had three. The auxiliary troops, both foot and horse, garrisoned the forward areas in forts connected by strategic roads, with the legions in large base fortresses behind. Thus in Wales the fort-system had a southern base at Caerleon-upon-Usk, the fortress of the Second Legion, and a northern one at Chester: the Twentieth Legion there also helped to secure the north, the chief base for which was the fortress of the Sixth at York. Hadrian reduced the garrison of Wales, and consolidated that of the north and its hills to support his new frontier-line, designed now where the retreat from Scotland had been stayed—the line of his famous Wall, from Tyneside to the Solway. The main features of Hadrian's Wall are well known—its great ditch and superb stone construction (though the original western sector was of turf-work), the 'mile-castle' and pair of turrets spaced along every mile of it, its seventeen major forts, and the road and 'vallum' or civilian frontier-earthwork behind. But it was meant as an offensive base as well as a defensive obstacle. The enemy beyond it had still to be attended to.

After some twenty years, with Antoninus Pius Emperor, the northward offensive was restarted. The enemy tribes were reduced by deportations to the Continent, and a second Wall, of turf and clay, was built between the Forth and Clyde, and connected by



(Above) A legionary fortress: Caerleon-upon-Usk, headquarters of the Second Legion. Within it, barracks, offices and stores; outside, women's dwellings, shops, etc., baths and amphitheatre. (Opposite) A country town: Caerwent, in Monmouthshire near Caerleon, shown likewise 'reconstructed' after excavation. Within, houses, shops, central forum and town hall; outside, 'Romano-Celtic' temple





Ashmolean Museum, Oxford (air-photo, G. W. G. Allen)

Fields of a British settlement (Fyfield Down, Wilts). Such 'Celtic fields' were tilled throughout Roman times. But native hill-forts were dismantled: below is seen Maiden Castle, the finest in southern Britain, with its multiple fortifications, completed late in the pre-Roman Iron Age

London Univ. Institute of Archaeology (air-photo, G. W. G. Allen)





Ashmolean Museum, Oxford (air-photo, G. W. G. Allen)

For pacifying the country Roman roads were a vital instrument: laid out first strategically, for army movements and police-work, they remained to serve civil and economic life. Many are still roads today. This air-view shows one marked by lanes and hedges, between Marlborough and Winchester

roads and garrisons with Hadrian's system in its rear. By taking in and pacifying this block of territory afresh, the intention of a cautious return upon Agricola's footsteps could be gradually developed. But the return was not cautious enough. Not only were the unconquered tribes too strong, but the conquered were not yet past rebellion. About 156 there was revolt as far south as Derbyshire; and the frontier problem grew not easier but graver, till about 181 the Northern Wall was pierced. The defeat was retrieved only with great effort—so great that, in the upshot, the Antonine line was given up. Return to it was perhaps still hoped for; but now, between 193 and 196, the governor Albinus did a disastrous thing. He claimed the whole Roman Empire for himself, took his army away to Gaul to fight for it, lost, and left all northern Britain to be overrun. For his successor to retrieve this catastrophe was a greater effort than ever, for the barbarians had destroyed everything Roman that they could. The York and Chester fortresses, many forts and Hadrian's Wall itself had to be extensively rebuilt. And when the new Emperor, Septimius Severus,

came over to decide the future of the frontier, he gave up for ever the idea of conquering the whole of Britain. Instead, he determined to destroy the power of the tribes in Scotland so utterly that Hadrian's old frontier could be reorganized as a safe permanent limit of Roman dominion. So he launched upon Scotland a great series of punitive campaigns; and though he wore himself out with them and died (in 211 at York), he had done his work with terrible thoroughness. For nearly a century to come, even when the Empire elsewhere was in desperate danger, Britain had peace.

So issued nearly two hundred years of military exertion and expenditure. Had it been worth the Romans' while? How far was the Britain behind the armies a success for their civilization?

The best known of all Roman works are the Roman roads. In Britain, as everywhere, their primary planning was strategic, but they opened up the country for every purpose, and many of course are still roads today. From London, the hub of the system, linked directly with the Kentish ports, they radiated to Col-



Verulamium Museum, St Albans

A Roman villa: the medium-sized country farmhouse at Lockleys near Welwyn (Herts), 'reconstructed' after excavation. The rectangular plan, in this case with timber-framed upper structure on masonry base, was a Roman innovation. But villas sometimes, as here shown, succeeded simpler dwellings belonging to their land's pre-Roman cultivators

chester and East Anglia, to Lincoln, York and the north ('Ermin Street'), to Verulam and the north-west ('Watling Street'), to the west, with forks to Gloucester and South Wales, Bath, Exeter and Southampton Water, and to Chichester ('Stane Street') and elsewhere in the south. There were many cross-routes, notably the 'Foss Way' from Lincoln to Devonshire, and Wales and the north were effectively intersected. With the numerous branch roads and surviving British tracks, the country was well served, especially for its trade and industry.

Import trade brought Mediterranean and Gaulish goods, notably the red-glazed 'Samian' pottery; but British pottery output was very great, and metal-working and mining were leading industries throughout. Iron was produced above all in the Weald, the Forest of Dean and the Midlands; copper in North Wales and Shropshire; and lead (and from it silver) there also, and in West Yorkshire, Derbyshire and the Mendip Hills. Wales had a gold-mine; later, the ancient Cornish tin-workings were revived; lesser products included salt and outcrop coal. But all minerals were state property, and their profits thus enriched the Imperial Treasury more than Britain. For the internal prosperity of the Province the government looked chiefly to the land.

Before the Roman conquest the Britons had mainly farmed the land in small, squarish

fields, grouped round their villages or homesteads. That system continued and indeed expanded, above all on light soils such as chalk; and villages and many homesteads seemingly remained but little changed, except by growth in numbers. Even the Fenlands reclaimed by government engineering were largely farmed likewise. But some fields still visible there are long and strip-like, suggesting a heavier plough; and this more economic mode of cultivation, already known to the pre-Roman Belgic invaders, was probably expanded much more widely. We know nothing directly about land-tenure in Roman Britain, but we do know that occupants of the wealthier sort of estates, probably as a rule cultivated on the strip system, lived on them in 'villas'—country houses, with their various outbuildings, designed in a civilized Roman style. Some, like that at Welwyn here portrayed, replaced pre-Roman homesteads; but many more were on new sites, bringing into cultivation new and better land. The villas, in fact became the chief element in British rural prosperity. Their remains are commonest in the south, but may occur even beyond the Severn and the Plain of York. Their usual occupants were evidently upper-class Romanized Britons, who as their wealth grew built them more and more for comfort as well as for efficiency. Multiplication of rooms, mosaic pavements, painted wall-plasters, the 'hypocaust' central-heating

system, suites of baths (like our 'Turkish' baths), all become gradually more noticeable, especially in the peaceful time after Severus, and after that again.

But with the country we have to consider the towns. It was through them that the villa-owners acquired their civilized habits. For the Romans, like the Greeks, held towns to be the essential units of civilization. Thus their chief and largest town in Britain, London, and their 'Colonia'-towns for army veterans, Colchester first, then Gloucester and Lincoln, and lastly York, were meant to give the Britons a pattern of civilized life; and when they made administrative districts out of the old tribal territories, each had a town created as its capital. We can here name only those appearing in our illustrations. Caerwent, tribal capital of the Silures in South Wales, can be 'reconstructed' from an almost total excavation; Verulam, by St Albans, has been excavated in part; and excavation at Leicester, capital of the Coritani, has shown that the massive ruin called

the 'Jewry Wall' belonged to a big public building. Such edifices would include a central *forum* and *basilica* (market-place and town hall), temples, public baths (at Bath, where the spa waters were sacred, the two were conjoined), a theatre (as at Verulam) or amphitheatre, and town walls, with arched gateways, like that which still stands at Lincoln. And of course there were many town houses, with the amenities such as hypocaust-heating and mosaic pavements that were repeated in the country villas, and shops and industrial establishments; outside the walls were cemeteries. The widespread number of lesser towns rendered the same pattern on a smaller scale.

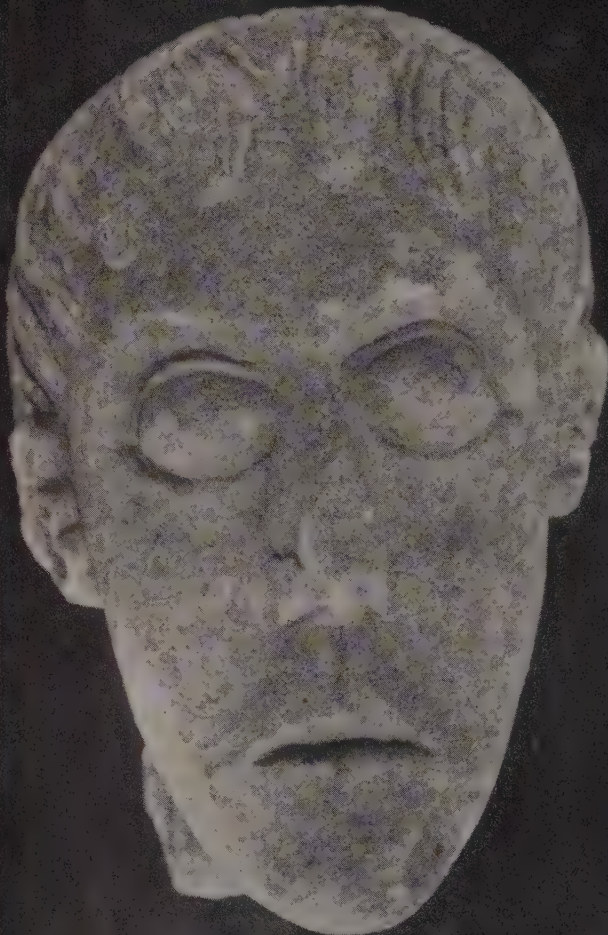
The towns in general prospered until the later 2nd century. But after that they began to decline; for town building and maintenance was costly, and the economic resources behind it came not from any basic industrial progress, but directly or indirectly from the land. And land development was not strong enough to support the whole of such a burden as well



London Univ. Institute of Archaeology

Both in villas and town houses, wealthier people enjoyed well-appointed rooms, with coloured mosaic or 'tessellated pavement' floors, and 'hypocaust' flues, for central heating, beneath them and up the colour-plastered walls. Excavation of this Verulam house revealed a hypocaust (flue-arch in foreground) below a characteristic pavement

The impact of Roman sculpture on British art. This head (once tinted red) from Gloucester, shows the strange, abstract mode of Celtic imagery, alive under early Roman influence



T. D. Kendrick

as the taxation required for the government and army. The Colonies and commercially richer towns doubtless fared best. Severus showed an active interest in promoting town vitality. But it was largely the self-interest of a tax-collector, and high taxation was soon draining the vitality away. On the other hand, the country villa economy went on expanding, for rural life was found better suited to rural wealth.

Indeed, the economy and society of Roman Britain came nearer to success on these more strongly rural lines than on those of the original effort to make Mediterranean town-civilization absolutely dominant. Provincial-Roman culture, and with it some degree of Latin literacy and thought, had certainly been diffused. But in general it sank in most effectively when most thoroughly diluted with native spirit.

That there was this dilution is clear not only on the showing of material life. In religion there was a varied intermixture of Mediterranean and native paganisms. Roman and British deities often became combined: local cults flourished; 'Romano-Celtic' temples multiplied in rural sanctuaries. In art, alongside the official and conventional Roman classicism, there was a native element, in the tradition of the Celtic art of pre-Roman times, which displayed itself in various and interesting ways. It could produce utterly un-Roman effects in sculpture, notably in the uncanny, dream-like abstractedness of the early head from Gloucester, here illustrated, and later in more forcibly barbaric pieces. It appeared even in industrial

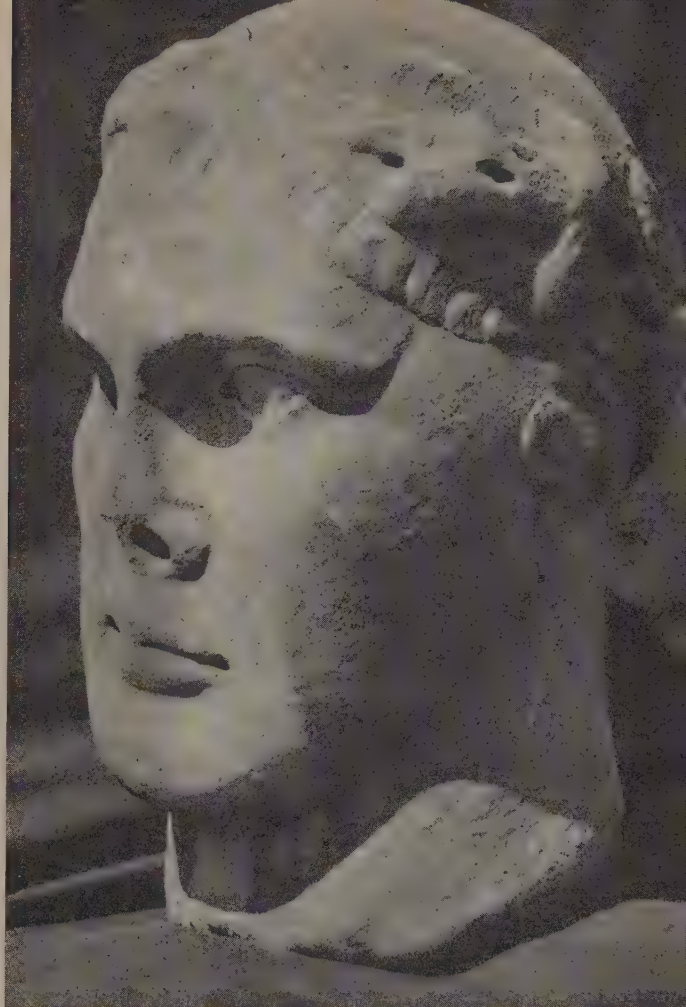
pottery; and in metalwork it long kept Celtic style alive, and in the end revived it afresh.

Thus while Roman civilization in Britain became much less Roman than had been intended, it issued in a real degree of Romano-British individuality. But the Empire's crisis of disaster in the later 3rd century inflicted political confusion and economic impoverishment upon every province. British suffering and resentment then led to 'separatist' feeling. When the Emperor Diocletian in 284 undertook his reorganization of the whole Roman world, Britain was mistrustful, and for some years pursued a sort of local independence. Power was seized by Carausius, the commander of the Roman Channel fleet; and only in 296 was his successor Allectus defeated and the unity of Empire restored. And here two more ominous facts stand out. First, Carau-

Portrait head of the young Constantine, from York; in the austere, impressionist late-Roman style (compare with picture on p. 509 of April number), so unlike the Romano-Celtic seen opposite

sus's command had been given him to defend the Channel against a new danger—the Saxons from Germany had begun their sea-raids. Secondly, Allectus opposed the Imperial forces by bringing south the garrisons from the Wall, and the tribes of Scotland, recovered now for all Severus's punishment, invaded Britain behind his back. The Imperial reconquest thus involved a fresh restoration of all the northern frontier and, as well, the completion of coast defence against the Saxons—a great line of forts, built along what was called the 'Saxon Shore' from Norfolk to Portsmouth Harbour, with Richborough, between Sandwich and the Isle of Thanet, as its centre.

Constantius, the man who accomplished the triple task, died in 306 in his northern headquarters at York, and it was from York that his great son Constantine set out to win for himself the whole Roman Empire. The noble portrait head of Constantine found and now preserved there dates from this time. It was the last time of tranquillity that Roman Britain had. Constantius had promoted town rebuilding, and in the country, though the peasantry had become a 'depressed class', bound to the soil, the villas flourished. But there were enemies on three sides now. Beyond the Wall were the Picts; the west coast was threatened by the Scots of Ireland; and the south-east by the Saxons. At last, in 367, all three invaded Britain together, and though restoration, fresh invasions, and fresh adventures abroad by would-be Emperors followed each other for forty years more, they were the final years of Roman endeavour.



R. P. Wright

In 410 the Empire gave Britain up.

Yet all had not been done in vain. Though the villas went, the country folk lived on, and the chief towns and roads remained: they are with us still. And within a century the surviving Britons brought the Picts and Scots to a standstill, and let in the invading Saxons only to turn at last and so retard their progress, that a British element survived—as well as in Wales—in much of what became Saxon England. Their greatest war leader in this was the famous Arthur. He was a true Romano-Briton, and a Christian too; for it was in Roman Britain that Christianity first took root in our islands, to give them the great and long-lived Celtic Church. Imperially speaking, indeed, the Romans in Britain came to failure. But in the long view of history, they left behind them more than they knew.

Treasure from The Americas

by C. A. BURLAND, F.R.A.I.

MANY people, among whom William Prescott was perhaps the most famous, have written of the America discovered by Columbus only four and a half centuries ago. The chronicles from which they derived their information record how Cortes first met the Mexicans at Vera Cruz in 1519 and how at Tumbez in 1528 Pizarro first saw an Inca nobleman with great golden discs in his ears. Forty years later that world, with its barbarism and beauty, was gone. Its gold, poured into Europe, revolutionized world history. Actual specimens of the treasures described by the *conquistadores* remain largely unknown to the world because so few escaped the melting-pots of the white man. In the illustrations here shown may be seen some small and poor examples of the craftsmanship that made them; they were all discovered comparatively recently in Indian graves, and during the



(Left) Beaker made from sheet gold by embossing and repoussé work: it comes from the coastal region in the neighbourhood of Ica, Peru. (Right) Bell cast by the cire-perdue process and found at Palenque in South Mexico. Its Maya origin is shown not only by the strange 'nasal' on the head-dress, but by the large flower-like ear-plugs, which, carved in jade, are typical of the Maya area

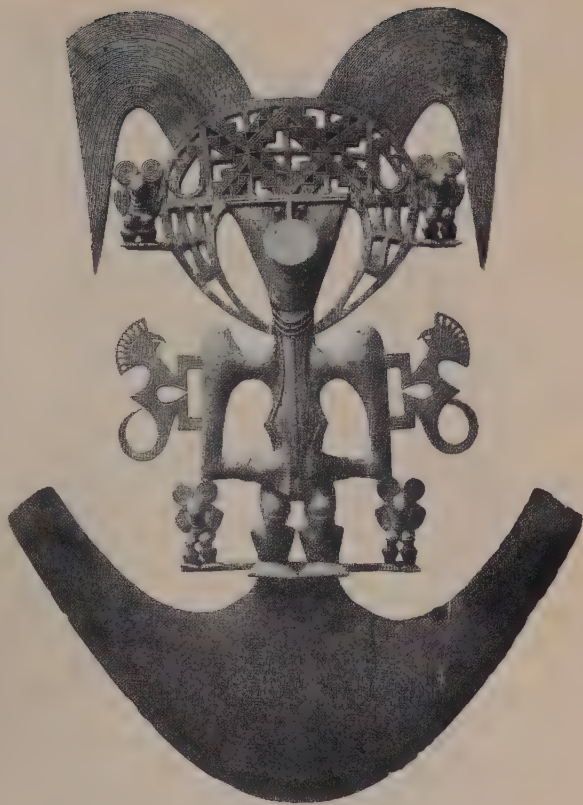
last century have found their way to the British Museum where they are preserved in the Department of Ethnography.

Copper and gold are found in native metallic form in various parts of the Americas, and the Indian tribes soon discovered how to beat the soft metal into shape with their stone tools. A real metal technology seems first to have arisen in the Peruvian highlands. Here metal was melted down in crucibles and mixed to produce bronze. Further north the Colombian smiths produced equally hard alloys known to us as *tumbaga*, from an admixture of copper, silver and gold.

The Indian smiths worked under considerable limitations. Except for a small area of the Peruvian coast, the balance was unknown, so they mixed their alloys by quantity rather than by weight, with the result that composition varied immensely. One suspects that the handful was the unit used!

None of the American peoples invented the bellows. All smelting was done in crucibles over an open fire in which forced draught was supplied by the efforts of the smith's assistants who crouched around blowing through tubes of cane, or metal. In spite of the Peruvian discovery of tin, and possibly lead, no true soldering appeared on the American continent in pre-Columbian days.

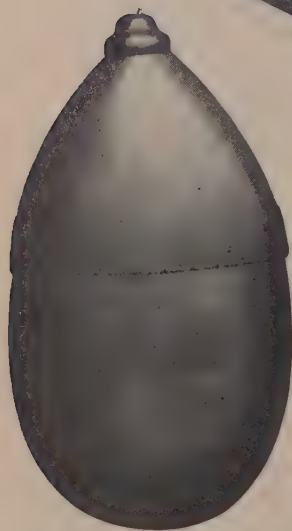
Tumbaga 'knife' from the Coconuco tribes of Colombia. The figure and decorative details are cire-perdue castings fused together after separate manufacture. The blade appears to be of a copper-silver alloy plated with thick gold leaf



Golden objects from the Talamancan people of Panama and the Guetar people of Costa Rica. It was on this coast in 1502 that Columbus first saw Indians wearing pendants of pure gold. On October 5 of that year he took two pendants from them for transmission to Spain. These pendants proved to be the first-fruits of the great gold-rush which so rapidly subverted the culture of the Indians



All photographs from the British Museum



(Above) *Plaque embossed with a stylized female figure and birds from Southern Colombia. The goldsmiths used stone dies to produce these decorative motifs.*
 (Left and Right) *Bottles from the Quimbaya of Colombia. Such objects when made from tumbaga were often given a surface enrichment of pure gold by a process of washing with vegetable acids which dissolved out the copper; the remaining layer of gold was brought to a high finish by burnishing*



Metal objects were joined by fusing their heated surfaces under the blast from a blowpipe. At Supe in Peru they even achieved the almost impossible feat of welding copper, which tends to oxidize rapidly as it approaches welding temperatures. Casting for all but the simplest forms was by the rather complicated *cire-perdue* process in which a wax model of the object was made and a fire-clay mould built up round the wax. When the molten metal was poured in, the wax was replaced by an exact metallic reproduction of the original model. An amazing variety of methods of gold-plating was practised—some tribes seem to have pressed gold leaf onto heated metal objects, others etched the copper from the surface layers of tumbaga by means of an acid vegetable wash, and then burnished the enriched golden surface—while in Panama the process of mercury amalgamation was known. These plated objects caused the first conquerors much disappointment, but it must be admitted that the technical skill exhibited makes them of more interest than pure gold to the modern student.

By the time of Columbus knowledge of metallurgy had spread as far as north-west Mexico, and along the Andes to north-west Argentina. Although there seems to have been no direct contact between the peoples of Mexico and Peru, the diffusion of their metallurgy from a common source is strongly indicated by the facts that they both failed to invent a bellows and both used blowpipes, that for metal casting they both used the *cire-perdue* process, that they both made extensive use of alloys, and both fused on decorations without using solder. So many identical inventions and failures to invent can hardly have arisen independently. An extension of the argument makes it probable that their metallurgy had an independent origin on the American continent, since any Old World metal-working people would have found ready to hand all materials necessary for making bellows and small furnaces, tools which they would have thought indispensable to their art.

(Above) Pendant of Mexican work from the Isthmus of Tehuantepec. The warrior's 'top-knot' of hair, and the feather-work crest have been made from wire and fused onto the casting of the face by the use of the blowpipe. (Below) Plaque from Panama, portraying musicians. The complex form of this piece was obtained in one casting by the use of the *cire-perdue* process. (Right) Pendant from Chiriqui in the Isthmus of Darien. Although found at Chiriqui this figure represents a warrior with a typically Mexican equipment of spear-thrower, small circular shield and vertical 'flag'



Reconstruction in Yugoslavia

by ARTHUR CALDER-MARSHALL

(Pronounce c like ts; č and ć like tch; j like y; and š like sh)

IN June 1945 I was sent by the British Ministry of Information to Yugoslavia to write a film on reconstruction in that country. It was in a sense a follow-up to a film which I had scripted earlier in the year in Belgium, on the problems facing a highly industrialized country after liberation. Yugoslavia, we thought, provided the best example of a predominantly peasant community, united in the struggle for freedom but proportionately more devastated than any other European country.

I was accompanied by Jack Chambers, the director who would make the film to the agreed script; and the day after we arrived in Belgrade, we went together to see Dr Ribnikar, the Yugoslav Minister of Education, who was responsible for the State Film Corporation and all matters dealing with films.

Dr Ribnikar is the owner of the famous Belgrade paper *Politika*, before the war one of the most important liberal newspapers in Eastern Europe. He is a short thick-set man in his forties, married to a young Czech wife. He wears the 1941 Partisan medal, because though they did not go to the woods until 1944, they were both in the underground resistance from the beginning.

When we went in, the Minister got up from his desk and took us over to a small table, round which we could sit and talk. It was a pleasant custom, which I found in all Yugoslav government offices, that no official remained at his desk. Always, the little table; on which in the days when there was coffee, presumably the coffee-cups were placed.

Dr Ribnikar did not talk English; but in my bad French I explained what the purpose of our film was and asked him if he would give us a directive to guide us in the presentation of the story. This is the normal technique which I had learned in dealing with British and other foreign government departments. One must always get a directive and then later find out the truth. On the facts one discovers, one can then get the directive modified so that it has some contact with reality.

As soon as Dr Ribnikar started answering, I realized that my technique was wrong. "I can't give you a directive," he said, "except to say 'Go out. See things for yourself and

tell the truth.' I'm afraid that doesn't sound very helpful."

"It's the most helpful thing you could say," I answered, "but could you give me some clue, some indication of what you think the film ought to be about: I mean, what are your plans?"

"There's only one thing your film ought to say," he answered, "and that is that the reconstruction of the country is being done by the people, not by the government. We do not make the plans at the centre here. We coordinate the regional plans and assist where it is necessary to assist. But the planning is done at the village, the town and the county level in the first place and it is only when a thing cannot be solved at that level that it goes higher up. You will find that is the difference between your Western democracy, which delegates from the centre downwards, and our democracy which appeals to the centre in case of need. That is an oversimplification, of course; but you will see what I mean when you go out and see for yourself what is happening."

* * *

We had planned to make an extensive tour of the whole country, but we found that there was not the time. So instead we decided to go to Bosnia and Hercegovina and see what was happening there. Serbia itself had not been very heavily devastated, as the war had swept rapidly back and forth across the Serbian plain. In Serbia there was a slight surplus of food, though practically all other consumption goods, and especially clothes, shoes and drugs, were in terribly short supply. In Bosnia and Hercegovina we could see the full effects of the fighting.

We set off early one morning from Belgrade, driving for hours across the rolling plain along a white dusty road. In four hours we saw no motor transport at all; but there were a few, very few, carts drawn by horses or oxen. The road was there but it had more or less ceased to be a method of communication. A child was sitting on a backless kitchen chair in the middle of the road, playing with a doll. It had apparently never seen a jeep and trailer before.

In the town of Loznica there were signs of fighting, but elsewhere the villages were intact; sleepy, impoverished but still standing.



All photographs by W. Suschitzky

There is shortage of clothes and footwear in every part of Yugoslavia and in some places they have to be shared by two or more people. Where food is also short, people are too weak to do a whole day's work: and in summer they would rest throughout the heat of the day



Višegrad, on the banks of the Drina river, one of the 'moderately devastated' towns of Bosnia. Though the destruction varies enormously throughout the whole country, it is reckoned that over 500,000 or 20 per cent of the buildings in Yugoslavia were destroyed during the war. Liberation found 3,300,000 people homeless



The river Drina at its junction with the Lim. In the river bed lie the remains of three bridges destroyed since 1914. This picture was taken in September 1945. In early December of the same year, the first train crossed the new bridge. Of the 937 bridges destroyed during the fighting, 775 have already been repaired



The Yugoslav peasants have always had a toughness and capacity for endurance—perhaps because only those children survived who were physically very strong. Now the people have discovered in themselves the spiritual capacity, not only to conquer the enemy, but to run their country by themselves and for themselves



Young Partisans : he wears the Star of Yugoslavia. " To a Partisan, everything is possible." The woman is now secretary of the Women's Anti-Fascist League of Rogatica. A great deal of organizing and administrative work is taken off the hands of the Liberation Committee by the women's organizations and the young Pioneers



The People's National Liberation Movement is not anti-clerical. The war has strengthened religious faith and drawn together Moslems and Christians, whether Orthodox, Roman Catholic or Lutheran, in a way never known before. The old proverb of the country has come alive: "He is my brother, whatever his faith"



More than a tenth of the whole Yugoslav population was killed in the war. The memory of the dead is ever-present—a sense of grief but also an inspiration to those who still live. To the Orthodox Christian ceremony here shown, came Moslems who said: “It is fitting that together we should remember the dead”



The fact that peasant life in the mountain districts of Yugoslavia was so primitive before the war makes reconstruction simpler, because each peasant has the skills which have been lost by industrialized people, such as the ability to spin and weave clothes by hand. What they now most need are raw materials and tools

It was not till we reached Koviljača that we began to see what we were looking for.

Koviljača used to be a small watering-place. It is where the plain ends and the foothills begin, a sprawling little town with many trees, welcomeshade in the parched Serbian summer. As we drove in, we saw that under these trees hundreds of people were collected. Some were sleeping, with their heads pillowed on sacks of grain; others were cooking over camp-fires, feeding their horses, talking in tiny groups.

We stopped to ask where we could eat; and as we did so, everybody got up and started to move towards us. In a couple of minutes we were the centre of a large crowd who wanted to know where we were going.

Almuli explained that we were British; that it was our jeep and not his; that we were the crazy careful people who wouldn't take risks. And where could we eat? The chief spokesman was a woman. She laughed, she joked, she reasoned. But our driver was obdurate. He knew that we had thousands of miles to do across mountains on appalling roads.

As we drove off, I expected there would be at least a mutter of reproach from the crowd. But no. We waved and shouted "Zdravo" and they shouted "Zdravo" and waved back, smiling. They hadn't got away with it, but they bore no resentment.

At Koviljača and indeed at every town and village, they told us about their war, just as in every London district they will tell you about their bombs, remembering which raid destroyed which houses, whether it was H.E., incendiary, fly-bomb or a rocket. But there was this difference, which must never be forgotten. London was bombarded by Germans out of the sky; it was bitter to suffer, but it was also impersonal.

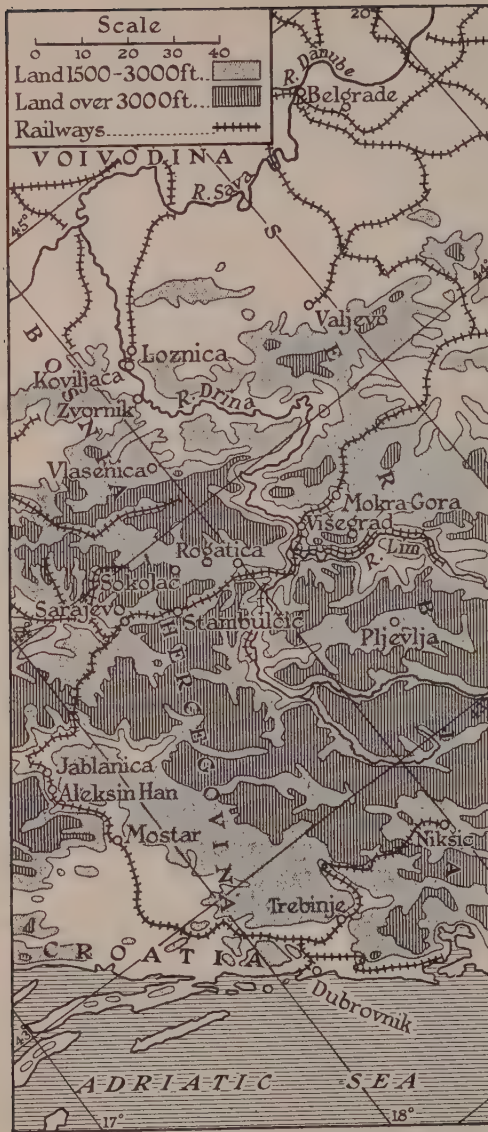
To the Yugoslavs, the enemy had names and faces; not merely German and Italian names, but also Yugoslav names. The enemy swaggered down the street, gave orders, took hostages, burned houses, raped and killed. Their war was not just a military



Stanford, London

or ideological conflict. It was total war, fought on all planes, spiritual as well as physical.

This spiritual quality both of the fighting and the reconstruction impressed me more than anything else. External observers approach Yugoslavia thinking in political terms. They think for example of Mihailović and his četniks as Pan-Serb royalists and the People's National Liberation Movement as Communist. But to the people who were in the centre of the fighting this distinction is irrelevant and ridiculous. Though the old confusions were exploited by the enemy at the outset, it was not very long before the issue became a simple moral conflict between good and evil. On the one side were the German and Italian Fascists and ranged with them different Yugoslav 'Fascist' organizations, the White Guard in Slovenia, the Ustaši in Croatia, the četniks in Serbia and Bosnia; on the other side was the National Liberation Movement, fusing all racial and religious elements into a popular fight for freedom. No doubt the motivation of the Fascist forces was diverse; the bully, the coward and the traitor serving side by side with the confused idealist. But to the simple people the history of that savage conflict was scratched; across the faces of whole towns and villages it was a simple issue between good people and bad. And the memory of every individual killer was fresh in their minds.



Destruction in Bosnia is not spectacular, compared with the desolation of Monte Cassino or the piled ruins of Hamburg or Cologne. In fact, in many places it is very hard to see what destruction there is, because it is total. For twenty miles between Zvornik and Vlasenica, not a house was standing. All had been razed to the ground. There was no sign of cattle in this cattle country, and the horses pulling the laden carts were famished, their ribs sketched on their taut skin.

When it grew dark, it was plain that though there were no houses, the valley was inhabited again. For every few hundred yards there was a fire blazing by the roadside and the figures of people bent over the flames cooking, or lying huddled within the circle of its warmth.

We spent the night at Vlasenica in the house of a woman who was the secretary of the Women's Anti-Fascist League. Her husband had been killed during the war and she was three times captured. She was very apologetic, because she could give us no food. They had nothing in the house except some milk, from the cow which was tied outside the back door. There was no light in the house and so we stood in the moonlight talking until they brought from the central committee one of the only oil-lamps in the town. Then we went in and made our supper from provisions we had brought with us in the trailer.

We invited our hostess and her family to eat with us, but they refused. That was too great a humiliation, to be treated in their own house. "We have eaten already," they said. But there was a little boy in the house, about nine years of age and wearing Partisan uniform. We were allowed to invite him to our table and he came and sat on the bed between me and the driver.

He was very shy and very polite. He sat with his hands pinned between his knees, watching all the tins that were being put on the table, the butter, the steak and kidney pudding, the marmalade, the sardines, the chocolates, things he had heard about but never seen. We put a large plate of food before him and his hands came up and he started eating, trying to eat slowly for politeness' sake, but unable to. Each time he finished his plate, the hands went back between the knees, and he shook his head when we offered him more. But then as we filled it up, his eyes followed every movement of the fork. And every now and again he glanced up at his sisters, who were standing in the next room in the half-darkness, watching us hungrily but refusing to eat.

The ration for the first two months after liberation had been six ounces of grain a day; and the children during this period ate only every other day. Now it had been increased to about eight ounces a day. In five months they had received four ounces of soap and one pound of sugar; and there did not seem to be much likelihood that they would get more for some time, because UNRRA's requests for fats and sugar had been so drastically curtailed by the Combined Supply Boards in Washington. UNRRA experts

were desperate, because their minimal requirements, intentionally scaled below what was regarded as the basic minimum, were apparently being totally ignored in allocations by the Combined Supply Boards.

The result was an enormous increase in tuberculosis cases. The people of Yugoslavia have always been prone to tuberculosis because of the very low standard of living which the majority of them had, even in peace-time. The privations of the war and the inadequacy of relief have had results which so far cannot possibly be calculated, because the means of coping with the disease do not exist.

Vlasenica for example was the capital of a county in which 40,000 people lived before the war. It possessed a hospital with ninety beds and one doctor for the whole county. This at first shocked me, until the Secretary of the *Sreski Odbor* (County Council) pointed out that there had never been more than one doctor in the county. "Things are better already than they were before the war," he said. "There are now only 26,000 people living in the county; and though we can't train doctors quickly, we have six trained teams of nurses who tour the county, giving advice on hygiene and the prevention of epidemics. Here we are lucky."

And he was right. Compared with the neighbouring county of Rogatica, for example, they were lucky. In Rogatica, the hospital had been destroyed. All they had was a First Aid Post in a restored farmhouse; and in July, the only drugs which the doctor had were herbs collected by the children, half a small bottle of creosote as anti-septic and a little vanishing cream, which he used for the skin complaints which were prevalent owing to lack of soap and a balanced diet.

The Bosnian Government was at this time giving priority to food, which it rightly regarded as the best preventive medicine of all. As soon as railroad communication was re-established with the coast in September, a complete hospital was sent to Rogatica.

* * *

It was the secretary of the Vlasenica

A scene outside the Red Cross Hut in Rogatica where refugees were sheltered. As there was no plumbing, the bath was tipped on end. Hasnia, the little girl seen on the right, lost both parents, walked to safety in Slovenia, and had just returned

Sreski Odbor who really began to show me what Dr Ribnikar had tried to explain in Belgrade and what Almuli described as "the creative energy of the people". I had seen a few cows in the town and I asked him what priority classes they had for milk.

His face went absolutely blank. And so I explained our own priority system.

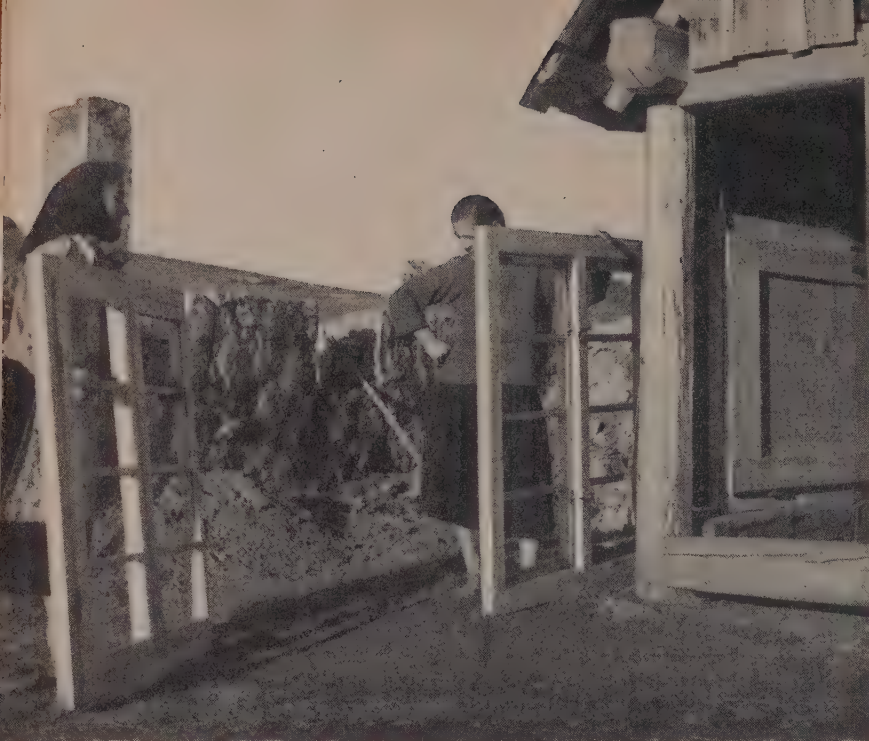
He shook his head and said, "We have no priority classes".

"But surely when milk is so very short . . ."

He said, "My friend, this town changed hands fifty-three times in the course of the war. You can see how many houses have been destroyed . . . though there are enough mind you, because of the seven thousand who lived here only three thousand remain . . . but we learned something during that time, something which I hope we shall never forget. We learned that to survive those who have must help those who need. And so there is no need for priority classes. Because if someone has milk, he gives it to those who need milk."

It was a very simple solution; a solution only possible among simple people living in simple





REBUILDING

Prefabricated doors and windows arrive and are stacked in the temporary hut until the permanent house is ready for them

communities. The hospital needed food, so the town-crier went out and announced it; and people brought food to the hospital, as gifts if they could afford it, or for payment if they couldn't.

All motor transport was controlled by the government. But the main form of transport remained the cart. The Odbor controlled forage and maintained the carts and in return every peasant who went to Serbia to buy grain brought grain not only for himself, but for other families as well. In our system of local government the smallest unit is the parish council. But in Bosnia the smallest unit was the individual citizen, not merely at election times but in the conduct of his everyday life. The vivid sense of citizenship was not just the product of propaganda or civic education; it was the essence of their living.

This was partly due to the fact that problems, hard as they are to solve, are simple to comprehend. At village meetings every major issue is expounded and discussed, so that every individual has a clear conception of what is being done and what part he plays in the life of his community. But it is also due to the discovery of latent power. The slogan, "To a Partisan, everything is possible", is not so much a boast or an exhortation as a surprised recognition of strength. Modern Yugoslavia is backward in industrial

development, social services and technique but in morale and the pride of citizenship there is probably no country so developed.

In the county of Rogatica, for example, there is a small village called Glasinac. It lies about half a mile off the main road up a track which has now disappeared, marked only by the different colour of the grass. Before the war it was a prosperous hamlet with over five hundred inhabitants. Now there are little more than a hundred of whom only thirteen are full-grown men. Of the five thousand animals, horses, cattle and sheep, there are only sixteen cows, thirteen sheep and a few horses; and most of these are gifts from the peasants of Serbia.

All the houses in the village were razed to the ground by the Ustaši; and the people in July were living in improvised shacks and holes in the ground. They were weak through lack of food and could not do a full day's work. Their ration was six ounces of grain a day and deliveries were irregular. They had to walk three miles to Sokolac to collect it and sometimes they would stay there for four or five days before it arrived. Then they had to carry it five miles in the other direction to have it ground at the nearest mill. They had no change of clothes and very few had any furniture apart from a few cooking utensils.

One house had been rebuilt, however, and

HOME IN BOSNIA

Clearing the site. The girl was released from the Army to rebuild her home. She did not want to be photographed till we said "Film is less frightening than Fascists"



Meanwhile the neighbours are cutting tree trunks into rough beams in readiness for the family to build as soon as the site has been cleared

when the head of the village took us there, we asked the owner, a woman who was spinning on the verandah, if she would mind our filming there. We had no lights and the verandah looked like an interior.

But she misunderstood us and thought we wanted to film inside the house. "Light!" she said, flinging back the door of the house. "Look at the light!" The room was shuttered and in complete darkness. On a German camp-bed was stretched a man sleeping. I just saw his white trousers in the darkness and the soles of his bare feet.

We had some sugar in a sack in the jeep and we asked her if she would like some. She fetched a large handkerchief and came with us to the jeep and on the way we passed a pile of sacks stacked in a field. They were full of grain.

I said to Almuli. "Six ounces of grain a day! Then what's all this doing here?"

He spoke to the woman and then turned to me. "You remember the man in the house, sleeping?" he said. "Well, he has come from working in Serbia and he is going to his village in Western Bosnia; and this is the grain he is taking for himself and the people of his village."

As we walked down the hill, we were joined by a little half-naked boy whose belly was distended with hunger and I thought of the stranger lying on the bed in the only house which had been rebuilt in that hungry ruined village, sleeping soundly in the knowledge that not a grain of corn would be taken from his sacks; and I remembered how in Brussels a few months before I had seen a sack of coal fall off the back of a lorry and in a moment there was a fighting mob of people and two minutes later you couldn't see the smallest nut of coal where it had fallen.

* * *

We chose as the location for our picture the county of Rogatica, because it was an average example, less devastated than areas like Bihać and the Lika in the north-west, but more devastated than a number of places. Out of eleven hundred houses there were still a hundred standing. Its summer position was worse than Vlasenica because it was farther from the sources of supply, but it was in less danger of starving during the winter, because it was near the Belgrade-Sarajevo-Dubrovnik railroad.

All available labour, volunteers from the towns and villages, prisoners of war and soldiers of the Yugoslav Army, had been put on to reopening the railway. It had suffered the most appalling damage, con-

tinually attacked during the years of fighting and in the final retreat of the routed Germans scientifically wrecked by German engineers. The bridge over the River Drina was blown up and as this bridge could not be approached by road, the plan was to delay the approach to the bridge as long as possible. Tunnels were blown in. Railway lines were mined. Sleepers were ripped up. Subsidiary bridges were destroyed. Rolling stock was derailed and shunted into ravines. Locomotives were wrecked with mines in the fire-box. Stations were demolished and all portable equipment removed.

The combined effort of the Bosnian and Serbian workers to reopen this railroad was the most impressive single operation that we saw. The only new bridging material was timber which was in plentiful supply. Trees were felled, stripped, cut to length, hauled and constructed at an incredible speed. Any parts of old bridges that could be salvaged were utilized, sometimes taken from one bridge to use on another fifty miles up the line.

When the film was being shot, the unit found it very hard to shoot bridge-building because they found that the work was going ahead so fast that if the weather packed up for a couple of days or so, they would have to move on to the next bridge.

In August the through line from Dubrovnik to Belgrade was broken by a ten-mile stretch between Aleksin Han and Jablanica and a seventy-mile stretch between Stambulčić and Mokra Gora. It seemed impossible that the work could be finished before winter came. But the first through train went through early in December.

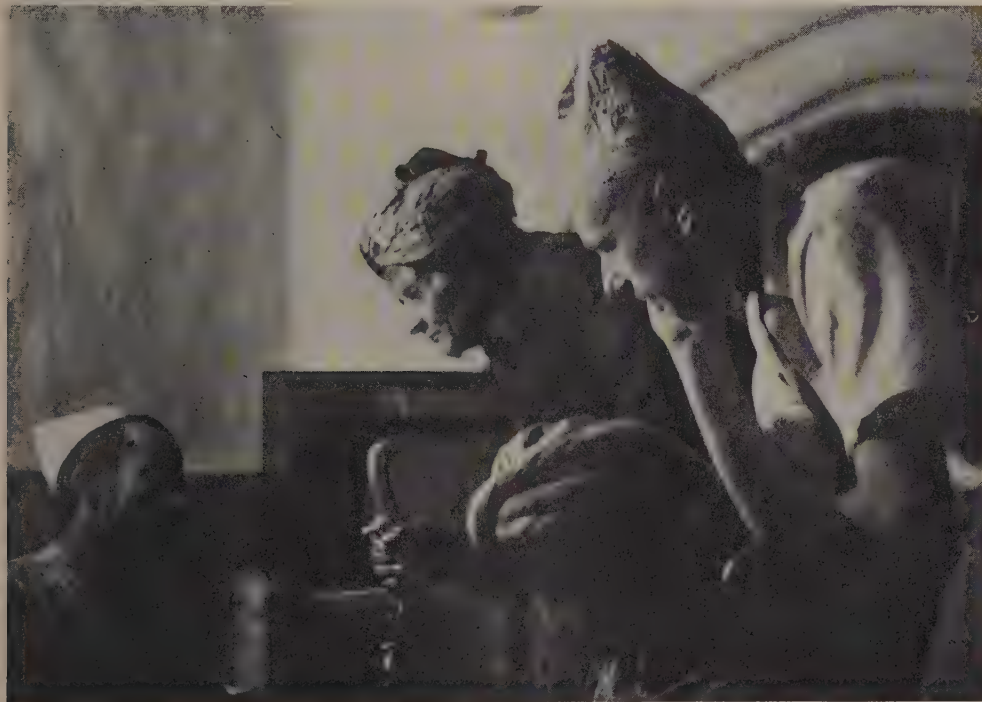
Now that the railroads are open and the ports are cleared, the first phase of reconstruction is ended. In each town or village there was strict equality of distribution; but while one area remained cut off from another, there was great inequality between the different areas. Now it is possible to even out over a much wider region; to reconstruct on a national scale.

There is still an enormous amount to be done. Until the 1946 harvest is reaped, the country cannot be self-supporting in grain. The shortage of leather, textiles, fats, machinery and livestock will remain much longer. There is no doubt that Yugoslavia will recover her pre-war level, and with the popular forces now freed will reach much higher levels of achievement. How quickly this takes place, however, must depend on the assistance which the Yugoslavs receive from abroad.

Britain's Broadcasts to the Arab World

by WILLIAM RUSSELL

Broadcasting has adapted itself to several varieties of audience which differ according to their geographical environment. In our December, 1945, number Mr Ryan described the audience in a single country, India, that has many languages and standards of culture to impede its progress towards national unity. The following article describes another audience, extending over many countries but connected by a common tongue and by a movement for national unity which is based on that tongue



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Listening to London—the Arabic news bulletin's critically appreciative audiences are scattered over the world. Here it is being heard in the house of a ruling family of the Aden Protectorate

BROADCASTING came to the Arab world less as a novelty than as an improvement. Arabia has always been the land of the spoken word, and the words of the Arabs are spoken in one of the most beautiful and flexible languages of mankind. It is true that the foundation stone of the Arabic language is a book, namely the Koran; but that book, which has been holy to millions for more than 1300 years, is itself revered as the record of

The Word, *par excellence*, and is so learnt by heart and recited. Thus over large areas of the Arab World to listen to a voice speaking loud and clear was a perfectly normal part of the social pattern of life. Eloquence is natural to the Arab; and it is through conversation and speech, rather than through reading, that emotions are surveyed and information disseminated. This has had two consequences of particular relevance to broad-



Keystone



Photographs from Arabic booklet issued by C.O.I. B.B.C.

Events in Britain of special interest to the Arab World are naturally accorded prominence in the Arabic transmissions from London. (Above, left) Sheikh Hassan Ismail, the Imam of the Cardiff Mosque, offers a short prayer at the civil opening of a new mosque and Islamic Cultural Centre built to replace the one destroyed by enemy action. (Right) Visiting London in 1943, H.R.H. the Amir Feisal (seated) gave a broadcast in the Arabic service. He is the King of Saudi Arabia's second son

casting; consequences which are fundamental to the whole development of radio in the Arab World.

First, in the Arab World, that a man or woman cannot read or write does not mean, as in other lands, that they are 'illiterate' in the accepted sense of the term. They have not read and they have not written because it was not necessary for them to do so. A child who in his early years has learnt by heart the whole of the Koran, has sharpened his memory to an extent which makes a notebook superfluous. Anyone who has taught Arab students will bear witness to their astounding powers of memory. It is therefore possible for them to take intelligent interest in the affairs of the world without having recourse to books.

Secondly, the coming of radio meant almost no conflict with already existing means of communicating ideas. There was almost no question of competing with press or theatre. On the contrary, radio was regarded, as has been said, as a mechanical extension of what was already a normal method of teaching and learning.

It was at once taken up with great avidity. To sit in your drawing-room, your Mejlis or your coffee-house and listen to the radio is as pleasant a way of passing the time as you can find. The Arabs have been in politics for several thousand years longer than any European, and they therefore understand a good deal about what is going

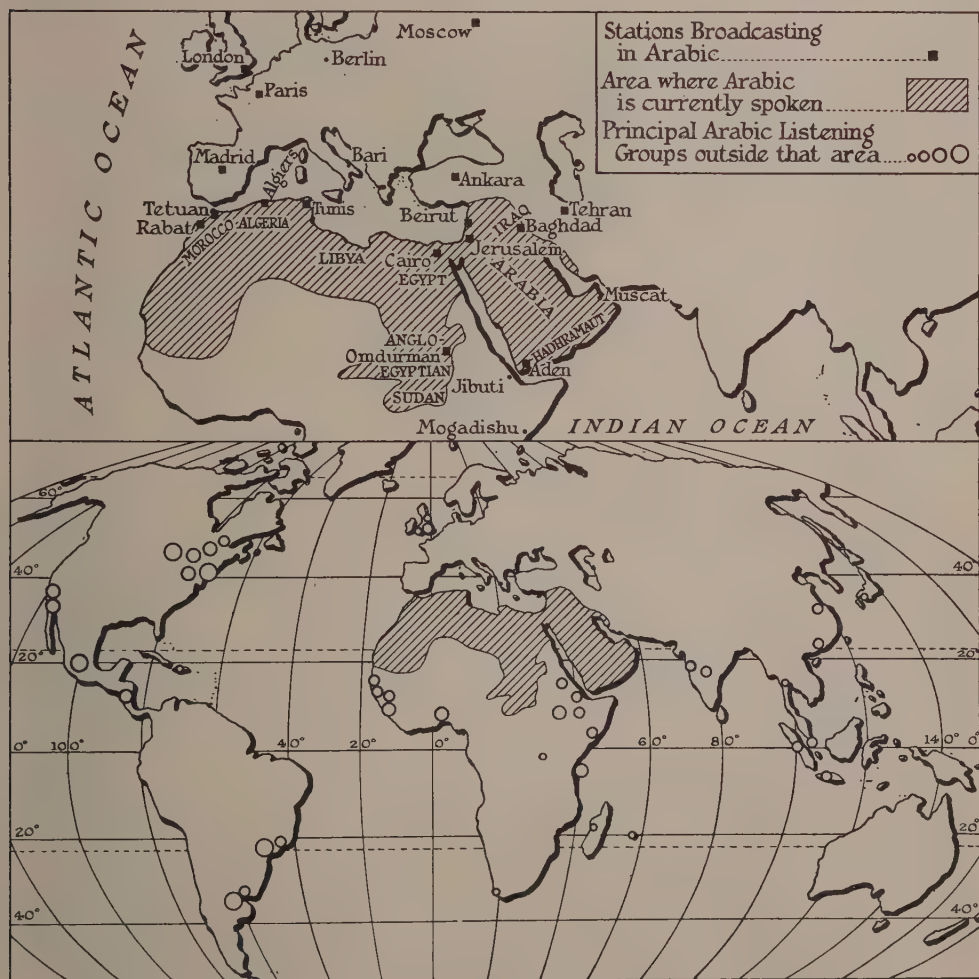
on in the world and take a lively and natural interest in it. The desert is its own Institute of International Affairs. I remember once, in December 1940, sitting in an upper story of a Dar or Tower in a remote town of the Valley of the Hadramaut in Southern Arabia. The radio had been turned on and we were trying to tune in to London—for the evening before the B.B.C. had announced the beginning of Wavell's great advance, and all day long I had been walking behind a camel which carried my portable cinema. Against the walls of the room sat a silent crowd of Beduin, none of whom you would have said was interested in world affairs. Suddenly from a corner a voice said to me in Arabic: "I say, where has Peterson gone to now that he has left Madrid?"

The only thing which conditioned the spread of listening was the availability of wireless sets and the strength of wireless stations. Arabic broadcasting was inaugurated in 1928 by Egyptian State Broadcasting, which was established by the Marconi Company under a concession from the Egyptian Government. This station at once became extremely popular, but it served Egypt only. The development from one regional station to the world-wide network that we have today has been amazing, and it has brought with it consequences of the utmost importance, not only to the Arab World but to Europe as well. International Arabic broadcasting, as it may be called, has served two purposes.

It has become a link between the Arab countries themselves, and it has enabled them to maintain daily touch with other continents such as would have been undreamed of twenty years ago. The forging of this link between Arab countries came just when the feeling of Arab unity—the result of that Arab renaissance which has been one of the most remarkable phenomena of the last eighty years—was beginning to become a reality. The second purpose which it served, the creation of links with Europe, has been a mixed blessing for reasons which will be explained below.

But both developments have depended primarily, not on politics or on propaganda but on engineering. The Arab World is a world of great spaces, and from the beginning

it was clear that the ordinary medium-wave station, if it were run on an economic basis, would not be powerful enough to cover an area which spreads from the Atlantic to the Indian Ocean. In fact the area of Arab listening extends very much further than that. There are thousands of Arabs in America and in the West Coast of Africa who now regularly listen to the B.B.C. Arabic Service and read the *Arabic Listener*; and many more in the Far East. Soon after the liberation of Siam the B.B.C. received a letter from a Syrian in that country thanking them for the hope and comfort which their Arabic Programme had given him during the Japanese occupation. In fact the Arabs are spread as widely over the face of the globe as almost any other race. By the 10th cen-



Stanford, London

ture of our era they had established themselves not only in Sicily and Spain, but also in Southern India, Canton and Indonesia. There are Arab colonies both in East and West Africa and in North and South America, not to mention Manchester, Cardiff and South Shields. In days gone by the links between such widely scattered units were few and far between. It was only the advent of short-wave broadcasting which made it possible for one voice to reach them all.

The first Arabic printed book appeared in Italy, and it was Italy that first instituted broadcasting in Arabic. That was in May 1934. The station chosen by the Fascist Government for this enterprise was Bari, which, alas, soon lived up to the epithet which had been bestowed upon it 2000 years before by the poet Horace, namely "fishy". It was at once evident that the Italians were using the new medium exclusively for political ends. Britain, despite warnings from more than one quarter, including many Arab friends, took no steps to answer the flood of lies and insinuations that Bari thought was its best contribution to Arab culture, until January 1938, when Arabic became the first foreign language to issue regularly from the B.B.C. transmitters. Germany followed in April 1939. Just when Japan chipped in is not known, but Arabic broadcasts from Japan were first identified in November 1940. Meanwhile a number of stations had been established within the Arab World, and such importance has the area assumed of recent years that there are now sixteen stations regularly broadcasting in Arabic—London, Paris, Madrid, Ankara, Moscow and Tehran among foreign stations, and Cairo, Bagh-

dad, Jerusalem, Sharq-el-Adna, Beirut, Omdurman, Aden, Tunis, Rabat and Tetuan among stations situated in the Arab World. Thus already most Arabs are in the position of having their own regional station, as it were, and at least one international station to which to listen if they so choose.

As is well known, they do choose. In the period immediately preceding the war Bari and Berlin established a considerable hold on the Arab listening public. For this there were two simple reasons. The first was that in those days their signals were very loud and clear, and the second was that they used their stations purely and simply as political instruments to subserve a vigorous propaganda campaign aimed at exploiting every possible grievance in order to belittle Britain and undermine her influence. As regards the first reason, it is a fundamental principle of broadcasting, so simple that it is often overlooked, that the human ear can only listen to one station at a time, and that, other things being equal, it will listen to the station which is most easily heard. To speak with the tongues of men and of angels is of no avail if you are to be drowned by some other more powerful station or lost in a welter of atmospherics. In the early days the Germans and Italians had the advantage of being nearer spatially to the Arab World than London. This drawback was later to be more than made good by the engineers of the B.B.C.; and those engineers must never be forgotten when credit is being assigned for the primacy which the B.B.C. now enjoys throughout the Arab World. As regards the second reason, the strongest ally of the Fascists was British silence. Nobody deplored this more than

Photograph from Arabic booklet issued by C.O.I.



"The B.B.C.'s London transmitters became the medium through which all that was best in the renascent culture of the Arab World reached listeners from Morocco to Muscat." In the studios of the Middle East Office at Cairo are recorded such exclusive features as (opposite) the orchestral music led by Raïs Hafiz Ali (a player for the last sixty years) and (right) the Koran recitals of Sheikh Mohammed Rifaat

our Arab friends. The Arabs resemble their language in being intensely logical. Many of them would have liked not to believe, indeed to refute, the German allegations, but when day after day they heard German accusations against Britain, particularly in regard to questions such as Palestine, and day after day Britain made no answer, many intelligent Arabs naturally assumed that Britain had no answer to make. Thus, when the B.B.C. did start broadcasting in Arabic, it started both at a great technical disadvantage and with much political leeway to make up.

From the beginning the B.B.C. set its face against imitating the enemy. It was felt that the difference between London and Berlin was the difference between light and darkness. Berlin wished to obscure, to create an atmosphere of murk for its own sinister ends. Britain, on the other hand, wished to resume and to enhance its traditional position, as the European race with which the Arabs had the most intimate ties. From the very beginning, therefore, the B.B.C. decided to build up a reputation for giving straight news, calmly presented, and to combine therewith a literary programme which would present to the Arabs the best of their own culture and of ours. Records of the Koran were specially made in Egypt by the finest readers and were then used for exclusive transmission from London, so that a voice which had previously been heard only in one mosque in Cairo should be heard throughout the Arabic-speaking world. The greatest living Arab savants were invited and readily agreed to give special series of lectures on literary topics, and the finest Arabic music was simi-



Photograph from Arabic booklet issued by C.O.I.

larly obtained. By this means the Arabic Section of the B.B.C. became increasingly a focus for all that was best in the renascent culture of the whole Arab World, and the London transmitters became the medium through which it reached listeners from Morocco to Muscat. In this respect London had an advantage which Berlin and Bari could never possess, for throughout the Arab lands Britain has living links with the people and their culture, so that it can tap resources which are available to no other country. For instance, when Iraq declared war on January 17, 1943, the voice of the then Prime Minister, General Nuri as-Said, was heard that same evening from London, delivering an appropriate message in both English and Arabic.

As regards news, it was decided that the news bulletin should be factual and objective, like B.B.C. bulletins in English. It was also decided that a balance should be kept as far as possible between international affairs and the affairs of the Arab World. Here again the B.B.C. policy has vindicated itself. To begin with, of course, it was attacked by many well-meaning critics, who said: "Why don't you make your bulletins snappy, as the Germans and Italians do?" The B.B.C. replied that Britain's relations with the Arab World were those of honourable friends, and that the language of friendship was truth rather than spice. Throughout the war the B.B.C. maintained this dual policy of straight news and cultural progress. The result has been that it now enjoys a primacy which no other foreign station can challenge. Its bulletins are regularly listened to and eagerly compared with those of other stations: the experience of six years of war has proved that they are true.

Regional radio meanwhile has made remarkable strides. The B.B.C. has now to

broadcast in some fifty languages. It is therefore impossible for it to devote the whole of its time to one area. Indeed it is remarkable that it manages to give four transmissions in Arabic a day. Stations in the Arab World itself are not so handicapped and there is a demand for the radio at all hours of the day and night.

It is foolish to generalize, and I use the phrase 'Arab World' with great diffidence. The cultivated gentle-folk of Cairo, Jerusalem, Beirut, Damascus, Baghdad, use their radios in exactly the same way as their counterparts in other countries of the world. But owing to both climatic and social conditions mass listening has been developed in Arabia to a degree which is certainly not found in Europe or America. Just as men formerly congregated to hear the Koran read or to listen to a story-teller, so now they assemble to listen to the radio. Each single radio set, therefore, reaches on the average a far wider audience in the Arab World than it could in Europe. Thus statistics recently compiled by the Jerusalem paper *Forum* show that

in the Lebanon there are 47 sets per 1000 of the population and in Palestine 34, whereas in Iraq there are only 6 and in Egypt 5; but this by no means indicates that fewer people hear the radio in Iraq and Egypt than in the Lebanon and Palestine. What it does mean is that the social unit in the Lebanon and Palestine is smaller and that climatic and geographical conditions are less favourable to mass listening.

In Baghdad, for instance, the radio, which is administered by the Directorate-General of Propaganda under the Minister of the Interior, may be heard throughout the capital in every coffee-shop and restaurant, as well as in private homes. It is

"Just as men formerly congregated to hear the Koran read or to listen to a story-teller, so now they assemble to listen to the radio." Palestinian Arabs in a public reading-room (left) and customers in a Baghdad café (opposite) exemplify the habit of group listening which means that "each radio set reaches on the average a far wider audience in the Arab World than it could in Europe"

Photograph from Arabic booklet issued by C.O.I.





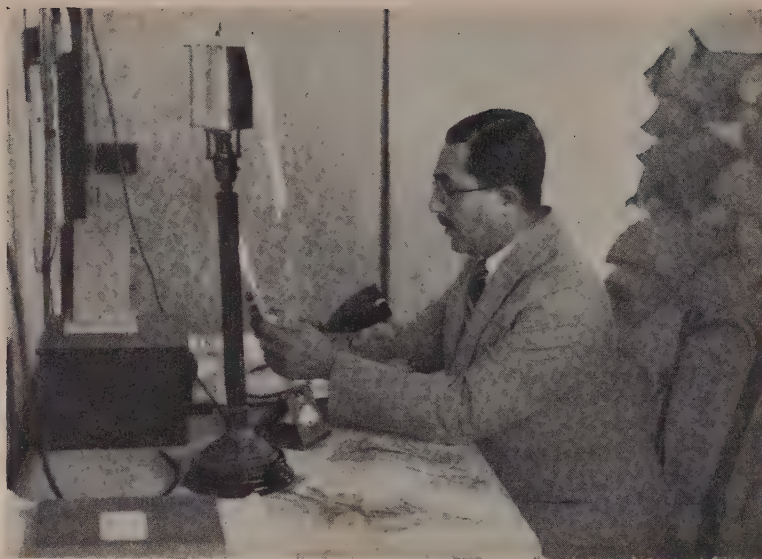
regularly used for announcing Government plans, arrangements for reviews, parades and other public affairs, because experience has shown that information so conveyed is known throughout the town with the utmost speed. In addition, Baghdad radio provides an excellent service of news and of entertainment. It should also be stated that since the advent of British forces during the war, it has generously given time for the entertainment of British and Indian troops.

One of the earliest experiments in mass listening was made in Aden in 1939. In those days to the majority of the people of Aden the wireless was practically unknown. But with the advent of the war it was essential to combat rumours and to give the citizens of Aden as full an information service as possible. A beginning was made with an improvised public address service in the chief square of the city. In the mornings a news bulletin was prepared by listening to the B.B.C. and this was translated into Arabic and delivered by an announcer through the microphone and loud-speaker in the evening. This transmission, though it was radio at one remove rather than direct broadcasting, at once became extremely popular, so much so that two more similar 'broadcasts' were soon installed, one in Arabic and one in Somali. Later, in 1940, through the co-operation of Cable and Wireless Ltd. who put one of their transmitters at the disposal of the Aden Government, a real broadcasting

station came into being. This gave nightly bulletins in Arabic, French (for Jibuti), Italian (for Italian East Africa) and Somali. It was a simple affair, but through the enthusiasm and skill of the engineers of Cable and Wireless it was extremely effective and very popular. After the liberation of Somaliland it was discovered that one of the most enthusiastic listeners to the Italian bulletins had been the Italian Chief of Police in Mogadishu. This Aden station, "Sowt ul-Jezira" or "Voice of Arabia", is still in being.

A war-time enterprise of a very different sort, and one which has become a favourite with the Arab listening public, is the station known as "Sharq el-Adna", or "Near East". This station is essentially a station of Arab youth. It has been in operation now for just over four years. It has a regular programme of 9 hours daily—the longest of any Arabic broadcasting station—though on feasts and special occasions this may be extended to 14 or even 16 hours. The main transmission includes the usual selection of news, special music, monologues, performances by the station *takht* or orchestra, talks, plays, Koran readings and a half-hour women's programme. The programmes are broadcast on three short-wave frequencies, and good reception reports have recently been received from places as far apart as Sweden and New Zealand.

The influence that such a station exerts must be considerable. The fact that it is



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The reputation gained by the B.B.C. in war time, through unswerving adherence to truth in its news bulletins, is shared by other stations that pursue the same policy. Sandbagged against Italian bombs, the studio of "Sowt ul-Jezira" in Aden was the source of broadcasts which penetrated the defences of the enemy; it is still wielding the sword of truth

broadcasting on powerful transmitters gives it a wide range of audibility, and the fact that the programme is continuous gives it the great advantage that once you have switched it on you do not have to re-tune. It is with you hour after hour without needing any attention. It has one further great advantage. The members of the staff are all young, the average age of the twelve senior Arabs who administer the station being about twenty-five. "Shark", as it is affectionately known, really is a broadcasting station run by Arabs for Arabs, and is undoubtedly a very significant phenomenon.

The foregoing is an attempt to give a general picture of broadcasting in the Arab World as it now is. Great developments are bound to ensue, now that the war is over. Baghdad radio, for instance, will soon be installing powerful new transmitters which will enable its voice to be heard not only throughout the length and breadth of the Kingdom but far beyond its frontiers. Other Arab capitals will no doubt follow suit. But the progress which has been achieved in less than twenty years of broadcasting in Arabic is truly amazing. It has proved a uniting, elevating and stimulating influence such as no other medium has been able to supply. Britain was, as so often, late in realizing the potentialities of this new invention, but also, as so often, when realization came, effective action followed. The B.B.C. now performs a quadruple function. It is the unique bond between the many thousands of Arabs who live beyond the boundaries of the Arab World in the

Americas and the Far East, and their homeland. Secondly, it is a unifying force for the Arab World itself. One of its special services, for instance, is to give week by week on a special day a News Letter devoted to the domestic doings of some particular country of the Arab World. This News Letter is appreciated not only in the country which it concerns—Baghdad Radio, for instance, regularly relays the Iraq Letter—but also week by week enables the Arab World as a whole to see what its component parts have been doing and thinking. Thirdly, the B.B.C. has made direct and solid contributions to the promotion of Arab culture. Its annual Poetry Competition, which now attracts hundred of entrants, is one example. Its series of English lessons for Arab listeners, the first of their kind in radio, is another. Finally, and probably chiefly, the B.B.C. owes its position to the fact that it has unswervingly stood for the truth in its news bulletins.

The general picture is one of happy co-operation and partnership. More and more the national Arab stations are developing and expanding as they should. The three hours daily of the London transmission cannot be said to constitute any menace to the natural development of indigenous broadcasting. On the other hand, the Sharq el-Adna station, administered as it is by Arabs for Arabs, is a development which every Englishman may hope will be received and welcomed as a model and as an inspiration to other young Arabs to do likewise.

The Northern Way

by DOUGLAS RITCHIE

During the war many of us came to regard with admiration and affection the qualities of our Norwegian Allies; few of us have yet had the good fortune enjoyed by the author (better known to Continental listeners as "Colonel Britton") of visiting them in their liberated country and discovering that its qualities are a match for theirs. More may be able to do so during the present summer

THIS article is about Norway and the Norwegians and I should make it clear at once that it is not by an expert.

Until the war Norway had made little impact on my imagination; and I must confess that if a psycho-analyst had invited me in the 'thirties to react to the word "Norway" I should probably have replied "Ibsen—Grieg—whaling—pale green—half lights—gloom."

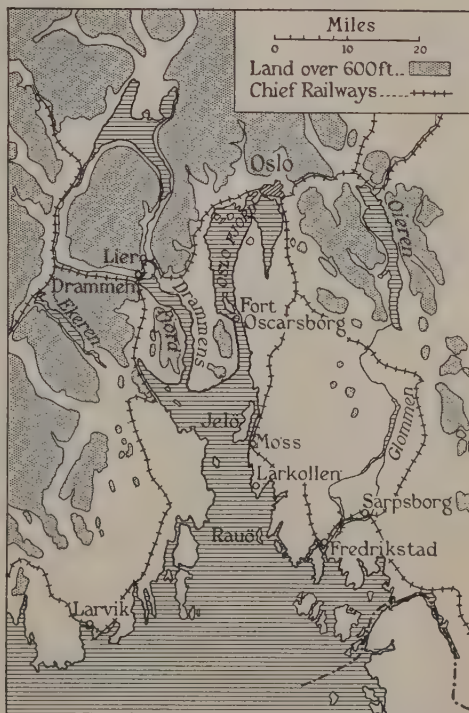
During the war I came to know a number of Norwegians well. I knew a good deal also about the conditions in the country under German occupation and about the resistance of the people. And since the war I have paid my first visit to Norway. If the psycho-analyst were suddenly to pop the word "Norway" at me now, my unhesitating reaction would be a short speech in which I should state that the Norwegians are an exceedingly attractive people, as civilized, intelligent, courageous, handsome, lively and romantic as any people I know, that they cook as well and have as warm houses and hearts as anybody, and that their country is as beautiful as the accompanying pictures suggest.

To most Norwegians, I should imagine, sailing up Oslo Fjord is one of the most moving experiences possible. Certainly it was to the whaling men who crowded the decks of my little steamer a few weeks after the liberation. Most of them were returning to their country after four or five years' enforced or voluntary exile and they were in a state of emotional excitement. They had spent most of the night before sitting round a table on the troop deck singing loud, and sometimes rude, Norwegian songs to the accompaniment of an accordion, but they were up before the sun, peering through the windows of the saloon as the Norwegian coast came into view.

The Oslo Fjord is about 65 miles long from its mouth to Oslo itself. At the entrance the fjord is perhaps 15 miles wide. Half-way up it narrows suddenly to less than a mile. Our ship took, as far as I can remember, about $4\frac{1}{2}$ hours to sail up the fjord, and

during most of the time the whalers and the few other passengers stood silently watching the pine- and birch-covered slopes on either side of us glide past. On this clear, calm autumn day the scene was exquisite and full of colour. Occasionally we would pass a little rowing boat or a fishing boat and the occupants would turn round to watch and smile and wave to a friendly ship as they had not been able to do for five long years.

Presently we passed a wreck—a fairly large merchant vessel lying half in and half out of the water. This was a German ship which, having been used to transport Jews from Norway to Germany, had been sabotaged by members of the Underground Movement in Oslo. Apart from this hulk there was almost



Stanford, London



Allies' Day! After five dark years Norway's capital rejoiced in celebrating her gratitude to the liberators. All along Karl Johans Gate, up to the Royal Palace, flagpoles were raised and decorated with the colours of Britain, the Soviet Union and the United States, for a parade of Allied troops who were acclaimed with tremendous enthusiasm

Above all, Norway rejoiced for the sake of the children, of the future. Even under the very windows of the prison where Quisling and other traitors were awaiting trial, no shadow could harm them as they bathed in the sunshine of the first summer of freedom. Older children remembered the help received from Denmark, which had managed to send them food during the war. Now Denmark needed wood: so all over the country they set up stations for collecting a return gift from the Norwegians' still slender store

no physical sign of the war, no broken windows and no ruined houses.

But the war did pass this way, as most people will remember, most dramatically in April 1940 when the German invaders entered Norwegian territorial waters and one squadron, consisting of the battleship *Deutschland*, three cruisers, including the *Blücher* and the *Emden*, and destroyers and other escorting craft, proceeded to steam steadily up the Oslo Fjord. There was not very much that the Norwegians could do but what could be done was done at once with great courage and without the slightest hesitation. In the outer part of the fjord a whaling boat, *Pol 3*, with one small gun, opened fire on the German battleship and the three cruisers. The *Pol 3* was quickly sunk and the big warships sailed on. A small Norwegian minelayer, the *Olav Trygvason*, then attacked and sank a German motor torpedo-boat, damaged a destroyer and even landed some shells on the *Emden* before she too was brushed aside.

Fort Oscarsborg stands sentinel, three-quarters of the way up the Oslo Fjord. Oscarsborg is a small island and its fairly large but old-fashioned guns had never before had to shoot at anything but a practice target. In April 1940 its gallant crew watched the formidable German warships approaching, held their fire until they could be certain and then sank the 10,000 ton *Blücher* which was carrying the nucleus of the German Gestapo and civil administrators for Norway. The Germans were held up for several hours before the fort was silenced by the Luftwaffe.

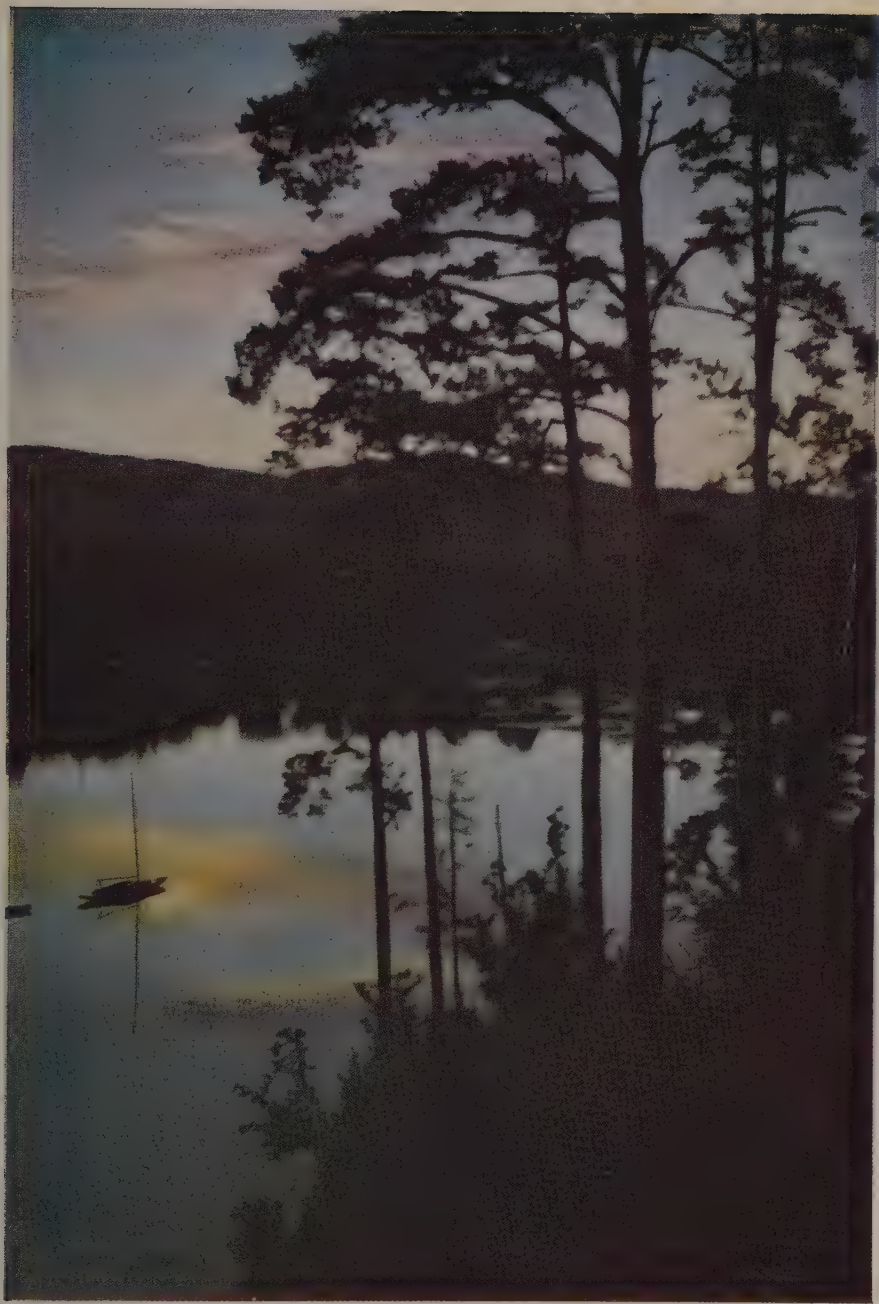
I stood on the bridge, watching Fort Oscarsborg come nearer and nearer, while the silver-haired captain, on his face the quiet smile of the sailor in his home waters, described what had happened. In his voice was a tone of mild and faintly amused astonishment, and it was plain to me that he was still puzzled to account for such extraordinary





(Above) Free to indulge again the Norwegian passion for the open air: queueing for a fjord-boat
 (Below) Off down the fjord: the steamer is decorated with birch-branches, symbol of mid-summer





As evening ends a long summer day at the Bygdö peninsula, one of Oslo's best-known bathing and yachting resorts, the years of enemy occupation seem like a far-off dream

foolishness on the part of the Germans. "I could have told them they'd be bound to be beaten in the end," he said. I asked him where the *Blücher* was. He pointed downwards. The fjord is very deep and she was still lying there on the bottom, fathoms below our ship.

You see Oslo, at the very top of the fjord, long before you get there. The tall buildings gradually take shape and you look for the three wireless masts on the very top of the mountain behind Oslo. Then the buildings become identifiable. The big dark-red building is the Radhus—the City Hall—and the grim, grey pile is the Akershus, an old fort and now a prison, in which, on that day, Vidkun Quisling was miserably awaiting his end.

Oslo is an attractive city. Not very large—it has a normal population of 250,000, about the same as Cardiff or Johannesburg; not very beautiful—it lacks the stateliness of Stockholm—but it depends on what you want of a city. Personally I value people above buildings, and Oslo, being a city lived in by people of character, has for me an atmosphere, a charm and a friendliness which rise above town-planning. This is not to say that it has no architectural features.

The principal street is the Karl Johans Gate, which runs from the Storting—the Norwegian Parliament—to the Royal Palace. This is Oslo's favourite promenade. It is, I suppose, about a quarter of a mile long, and it consists of a tree-covered space about 50 yards wide with a road on either side along which run single-decker trams with trailers. There are tall buildings on either side, among them the Oslo University, a handsome building. Just opposite the University, on the promenade and among the trees, is Norway's National Theatre where you may see at very reasonable prices the plays of Henrik Ibsen, Bjørnstjerne Bjørnson and others of the country's most famous writers. Beside the theatre is a bandstand where on a sunny Sunday afternoon I stood among the tall blond Norwegians who listened with pleasure and some puzzlement to a typical American dance band in military uniform playing the latest tunes.

The Royal Palace stands on a hill at the top of the Karl Johans Gate. It is surrounded by a fine park. Here is a characteristic indication of Norwegian democracy. There are no railings or gates and the people can—and do—walk right up to the walls and the entrance of the Palace itself, where the King is living today.

Oslo is, of course, not Norway, as many

Norwegians hastened to tell me. I was unable, in a short time, to go far afield and I have only space to describe one visit—to Drammen, at the head of Drammen Fjord which runs into the Oslo Fjord. Drammen is a very old and picturesque little town of some 25,000 inhabitants about 30 miles from Oslo. We were invited there by eight men who had been producing clandestine newspapers from 1940 until the end of the war. Their intention, we discovered, was very simple. It was to shake us warmly by the hand, show us how they had done their work and give us an enormous banquet at one of the Drammen hotels. Nothing more. All they asked of us was our attention and our appetite.

They met us in the public square, eight men in raincoats, and greeted us very shyly. We followed their car to their first printing plant, a small stationer's shop. The passer-by could see right into the shop from the street and very soon it became necessary to move. They went to a garage. This came under Nazi suspicion and they moved again, to a small store-room up some wooden stairs from a yard. Here for most of the war they had done their work. They had three wireless receivers. One was a pocket set delivered secretly by the British. It was of a type known all over Norway as a 'Sweet-heart'. The sets were concealed in the store-room. The duplicator stood on a counter and to the casual eye appeared to be used for printing advertising leaflets. The London broadcasts were listened to carefully each night and taken down. The news was then sub-edited, typed on a wax stencil and 3000 copies of the little newspaper were run off. The printing was done in the daytime when the machine would not be heard so easily because of the traffic and when its use would be less likely to excite suspicion. The 3000 copies were placed in a large despatch-case, along with an enormous revolver, and had to be delivered to a certain address. One man, his pockets empty of anything incriminating, would set out along the street. Fifty yards behind him would come another man with the precious despatch-case. Sometimes the Gestapo stopped people in the street to examine their papers and their parcels. The first man would walk into this ambush, loudly protest his love of Adolf Hitler and empty out his pockets while the second man would stop, look into a shop window and then turn around and retrace his steps to the store-room. There he would give the prearranged knock on the door—knock-knock-knock-



With the return of normal summer transport and sailing facilities, the people of the Norwegian capital can once more get out into its beautiful surroundings as soon as their working day is over





Kodachrome photographs by Ernst Schwitters

Golden birch: an autumn note in the fertile Lier valley near Oslo

KNOCK, as the clandestine editor said with a grin at me—and hide away the papers until the coast was clear.

"What happened to the papers when they were delivered to the receiver?" I asked. That they did not know in detail and never inquired. Their job was to print the papers and deliver them to this address, and that was all. Distribution was the job of a different organization. The less you knew the better. If you didn't know the names of more than your essential companions you couldn't give them away. All they knew was that the papers were delivered to loyal Norwegians through shops, through delivery boys and by other means. Other similar small units existed to print their own newspapers and deliver them to the central depot.

When we had asked all the questions we could think of, a visit was proposed to the Drammen ski-jump, up on the hills behind the town. It was not, of course, the time for skiing; the jump was being put into order ready for the winter and the work was being done by a gang of Norwegian quislings. We climbed up to the top, however, and looked with awe at the precipitous slope down which the ski-jumper would slip. I turned to the leader of the party, now a policeman. He was the man who used to walk along the street carrying the bag with the illegal papers and the large revolver and looking for the Gestapo, and I asked him if he was a ski-jumper. "No, indeed," he replied, "much too dangerous for me!"

We came down the hill into Drammen again and were invited to the policeman's house to taste *multer*, a preserve made from a rare berry gathered in the mountains. His house, pleasantly situated high up and overlooking the town, was divided into two most attractive flats and sheltered two members of the party, the policeman and a journalist on the local newspaper, *Drammen Tidende*. The two young wives, surprised by our visit, were not disconcerted. Their four children, ranging from two to twelve, bowed their blond heads to us, as Norwegian politeness demands, and behaved as all children do, asking for a second helping of the sweet *multer*, and refusing to go to bed until they'd had it. The two flats provided us with an illuminating and charming picture of Norwegian home life. Double windows, to keep out the cold of the long winter; central heating; light-coloured furniture of a modern type which would be fairly expensive in this country; gay, folk-weave curtains; and an upright piano in the journalist's flat.

But we were not allowed to stay here for long. The banquet was waiting. Husbandly advice to wives not to wait up; wifely admonitions to husbands not to come in late and wake up the children; and on we went.

The banquet was to me an astonishing affair. A private room had been taken at the hotel. We were served first with cocktails and asparagus soup. Then came lobster, assisted by a Liebfraumilch. I had by this time had some experience of Norway's post-liberation fare and I helped myself liberally and took a second helping, expecting that this was all. But I had not reckoned with the resource of the Underground Movement. The lobster was followed by a steak, the largest and most luscious and most crowded with vegetables that I had seen for years. The steak was accompanied by an excellent burgundy. It was followed by a Pêche Melba, coffee and French brandy.

What was the explanation of this I can still only guess. This dinner for about ten people, with such food, unobtainable at the best Oslo, and for that matter the best London, hotels, with this profusion of good wines and spirits, must have cost £50 at least and must have meant to our hosts, a policeman, two young journalists, a butcher, a student and three others, much planning and who knows what sacrifice.

I suspect that the answer was that the butcher had something to do with the steak, that the hotel had made a contribution to the wines, and that anyway this was a 'Liberation Party', with Norway's good friends the British as guests, and that expense was not considered.

The party went on until midnight with many jokes, a noble attempt to keep up the English language, a solemn note every now and then, a short and moving speech of thanks to us, the British, for what we had done in the war, and finally our warm and sincere thanks to our hosts.

I have given a rather sketchy account of my first, but I hope not my last, visit to Norway. The Norwegians have, I think, a very real affection for the British people which is based not only on the war but on a much wider identity of experience, in which the sea plays perhaps the important part. Thousands of Norwegians on or near the coast can reach each other by short sea journeys where it would mean a difficult journey of many miles by land. The Norwegians have, therefore, the saying: "The sea unites us; the land divides us". It is true of Britain and Norway and no less true of the British Commonwealth.

The Diffusion of Greek Culture

IV. The Moslem Carriers

by DR F. SHERWOOD TAYLOR

We have seen in this series how the influence of Greek culture spread westward in space, and in time up to the early centuries of our era. Then, in the West, followed the Dark Ages when Greek was no longer spoken or read. Dr Taylor shows how the light of Greek thought, though somewhat refracted in its passage through the Arab mind, came to illumine that of mediaeval Europe

THE unparalleled culture of ancient Greece passed through successive phases and then for long centuries slowly declined. Her literary and philosophic activity had passed its peak by the end of the 4th century B.C., but her scientific achievement culminated only in the Hellenistic culture of the 3rd and 2nd centuries, and for some time thereafter declined but little. Ptolemy and Galen, in the 2nd century A.D., were not mere compilers, but original workers also. In the 3rd century Diophantus, the discoverer of indeterminate equations, and Apollonius of Perga, the geometer, are among the greatest of her mathematicians. At the same time the Greek Alchemists were actively building up a chemical technique, which was but little improved upon in fifteen hundred years. In succeeding centuries originality became rarer, though there remained great plenty of literary men, bibliographers, grammarians, compilers of summaries and the like. Yet, even as late as the reign of Justinian (527-65), there were flowerings of scientific research. The medical men, Aetios of Amida, Paulus Aegineta and Alexander of Tralles, recorded sound observations and reasoned conclusions, while Anthemius of Tralles carried out researches on Conics, and constructed ingenious machinery. The commentators on Aristotle, such as Simplicius, displayed a clear understanding of his meaning and of many of the difficulties presented by his texts. So in the Greek centres of Byzantium and Alexandria there remained a fund of knowledge of the Greek culture, and even the potentialities of research. In the West it was far different. With the decline and disappearance of the knowledge of Greek in the 5th century, the knowledge of science departed, and the Western scientists of the

Dark Ages—Isidore of Seville, Bede and John Scotus Erigena—were ignorant in comparison with the Byzantines. The genius of the West was expressing itself in theology and liturgy, but science was not to revive until the 13th century.

Great advances in learning result, it seems, from the mingling of alien cultures, and Greek learning came to a second flowering where East met West. In Persia and Syria and India there were ancient cultures foreign to, though not uninfluenced by, the Greek. In Harrân there remained the ancient tradition of Babylonian star-worship, and with it, probably, the tradition of Babylonian mathematics and astronomy. In Persia there were scientific and philosophic studies under Shâpûr I (241-72), while in India there was a considerable body of scientific and philosophic writings, of which the mathematical were the most valuable. The influx of Greek knowledge into Syria and Persia was largely the result of religious controversy. In the 4th century and for many centuries thereafter Syria was one of the most active trade-centres of the world, and consequently it was a region in which Latin, Greek, Syriac, Persian and, later, Arabic were all languages of use and currency. In 431 the doctrine of the Nestorian Christians was held to be heretical; they were expelled from Constantinople and migrated to Edessa, where they formed an active centre of Greek learning, principally medical. The Emperor Zeno closed their school in 489, whereupon they further migrated to Nisibis in Mesopotamia, and finally transferred themselves, early in the 6th century, to Jundai-Shâpûr, the Persian medical school founded by Shâpûr II two centuries before. In this fashion Greek learning became disseminated in Syria and

Persia. The Syriac dialect, a Semitic tongue, had long been a literary language; and from the 6th century onward, translations from Greek into Syriac began to be made.

Then came the astonishing insurgence of Islam. The Arab states and wandering tribes combined, and between 622 and 750 Mohammed and his successors swept westward over Egypt, Africa, Spain and on into France; and northward through Syria to Asia Minor and to the very walls of Constantinople. Eastward they went through Persia into India and even to the borders of China.

This flood of military expansion was followed by a great development of the arts and sciences. Islam was primarily a religious institution, and in its early years under the

Umayyads (661-750) its attitude was intolerant and suspicious of foreign thought. In 750 the dynasty of the Abbasids succeeded the Umayyads. The Arab empire was split into three independent states centred in Spain, Egypt and the East. The Abbasids ruled the latter; they founded Baghdad and made it their capital, and there, under the caliphs al-Mansūr, Hārūn al-Rashīd, al-Ma'mūn and al-Mu'tasim, there was a wonderful revival of learning. The years between 750 and 850 were chiefly given up to finding and translating the works of Greek authors, through the agency of the Nestorian and Monophysite Christians who had migrated to Persia. Classics of Greek philosophy and science had already been translated into Syriac; thus Sergius of Resaina (d. 536) had



Stanford, London

[illegible]

هذا الشكل سرطان التسعة
 الشياطين التسعة وجميع الكواكب التسعة ومنها
 يكونون الالهة والدار عليهم فانهم راقون
 هذا الشكل الكلب يقول الكلابي لها اذا نكحها فليسع
 قافله واراد

So at the accession of the Abbasids there was already a rich culture ripe for the gathering, and these enlightened rulers ordered the collection of Greek and Syrian manuscripts and their translation into Arabic. About 800 Ibn Sahda translated some of the works of Hippocrates and Galen: Abū Yahyā al-Bātrikh (d. 805) translated other works of these authors and also one astronomical work of Ptolemy. His son Yahyā ibn Batrikh made further translations of medical works and treatises by Aristotle. Ptolemy's great work, whose usual title, the *Almagest*, shows its Arab associations, was rather badly translated at the beginning of the century, but in 827-8 Hajjaj bin Matar made a good

translation for the Caliph al-Ma'mūn, and thenceforward Ptolemy was the great astronomical authority.

In many cases we are clearly able to trace the course of Greek ideas through the Moslem to the Latin world. An excellent instance is that of Job of Edessa. He was one of the first to translate the scientific works of Aristotle, and he was especially impressed with Aristotle's system of the composition of all bodies from the four elements of earth, water, air and fire. In his encyclopaedia of scientific knowledge, *The Book of Treasures*, which has been translated by A. Mingana, he makes a bold effort to explain all natural phenomena in terms of the proportions of these elements contained in natural bodies. We can trace the ideas of Job of Edessa in the works of later Arabic authors, and we find them embedded in the works of Avicenna, Alpharabius and Averroes, whose ideas were in turn avidly absorbed by the mediaeval philosophers and scientists of the Latin world.

Hunain bin Ishāk (809-77), known to the Latins as Johannitius, may afford us a type of the men who brought Greek learning to Islam. Hunain was the son of a Nestorian Christian druggist, and began his medical studies at Jundai-Shāpūr when he was only ten or twelve years of age. Having completed his medical course, he went away to learn Greek, and then visited the Academy of Basra, famed for its literary studies, in order to perfect himself in Arabic. So at the age of seventeen he had a medical training and four languages at command, Arabic, Greek, Persian and Syriac, his mother tongue. He entered the service of Jibrā'il ibn Bakhtishū, physician to the Caliph al-Ma'mūn, and shortly became a super-intendent of the caliph's 'House of Wisdom', the library and academy where the Greek manuscripts were gathered, not only from all parts of the Arab dominions, but also from Byzantium and Asia Minor. Here Hunain and a staff of young translators made vast numbers of translations of Greek scientific manuscripts, in search of which Hunain travelled all over the Near East. His contribution was mainly medical and philosophical, and the bulk of the mathematical and astronomical manuscripts are said to have been translated by Hunain's older contemporary Thābit bin Kurra a Sabaeen star-shipper from Harrān. Hunain bin Ishāk was a man of character. He earned the approval of the Caliph by refusing under dire threats to obey his command to prepare a poison, a deed which would have been contrary to the commands of his religion and the

oath of his profession. His habits were remarkable. Each day he rode, then had what we should call a Turkish bath; he drank a cup of wine and ate a cake while being dried, and then slept. When he woke he ate a whole chicken in its broth and a loaf of bread and went to sleep again. Each day he drank half a gallon of good wine: so we must presume that he worked in the early morning before these gastronomic feats.

The period of translations was succeeded about A.D. 850 by a period of assimilation and active scientific and philosophical thought. The quantum that the Islamic scientists and philosophers contributed to any science was not large, but the mental activity required to adapt Greek thought, expressed in the Greek language, to the very different mental requirements of the Arab must not be underestimated. The Arabic authors' chief task was to interpret their world in terms of Greek thought—to adapt their matter to Greek forms: there was genuine research in science especially in mathematics, physics and astronomy, but never any strikingly new departure, such as we see so many times in the history of thought in 16th and 17th century Europe.

In assessing the relationship of Islamic and Greek culture we have to remember that the former absorbed only a part of the latter. What we regard as among the greatest achievements of Greece, her art and poetry, never passed to Islam; furthermore the Arabs knew the history of classical Greece only through the fairy-tale exaggerations of the legend of Alexander. The Greek contribution to Arabic thought was solely in science and philosophy, and it is in these departments of thought that we shall seek their achievement.

The Islamic genius is seen at its best in the realm of mathematics, astronomy and geography, and in all these the Arabs made real advances beyond their masters. There were of course no native Arab mathematics or astronomy, and it is clear that they derived these sciences from Greek, Indian and possibly Babylonian sources. It appears that the first mathematical influences upon Islam were Indian, for soon after 776 the work of Āryabhata had been used to construct planetary tables, whereas Greek mathematics and astronomy seem to have become generally known only after about 825. Greek geometry and astronomy were greatly superior to the Indian and in these sciences the Arabs followed close in the steps of the Greeks. It seems, however, that the Arabs were better instrument-makers and, linked with this, better observers. The chief astronomical instrument of the Middle



1

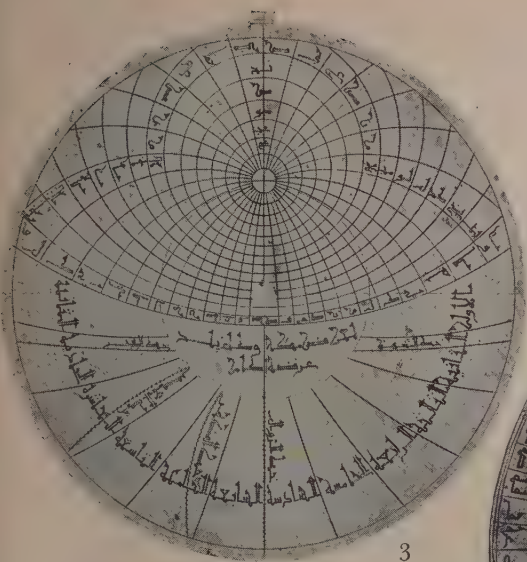
1. Moorish Astrolabe, c. A.D. 1650, in the possession of the Società Ligure di Storia Patria di Genova. The back of the astrolabe is a disc graduated in degrees and carries a centrally pivoted rule with sights, the alidade. It is suspended by the ring, and by sighting a heavenly body with the alidade, its altitude can be read off. The rectangular scale nearest the pivot is for calculations of heights and distances, for example the heights of towers or the width of rivers, by a method based on the geometry of similar triangles

2. Front of the astrolabe shown in fig. 1. This is hollow, like a shallow pan, and into it fit seven plates (fig. 3) each engraved with a projection of the heavens for some particular latitude. Above these plates is a movable map of the heavens, in the form of a metal network, showing 29 stars by the position of the projecting points—

Ages was the astrolabe, which may have been invented by Hipparchus (c. 150 B.C.). The astrolabe could give the altitude of a heavenly body and the time and latitude at which it was taken, as well as the points of the compass; and it was useful in astrology. The Byzantine Greeks wrote treatises on the astrolabe, and one of them, written by John Philoponus of Alexandria about the year 625, still survives. Almost at the same period (c. 650) Severos Sebokht wrote, in Syriac, a treatise on the astrolabe which certainly derives from Greek sources; and the Persian al-Fāzārī, who died about 777, is believed to have been the first Moslem to make one. Even the best astrolabes were incapable of giving readings of less error than 10 or 20 minutes of arc; and in respect of accuracy astronomy showed little advance in the 1700 years between the periods of Hipparchus and Copernicus.

The Arab studies of arithmetic and algebra

seem to have been indebted to other sources as well as to the Greeks. Near the close of Greek mathematical activity Diophantus wrote a treatise on what we term algebra, but he has no forerunners or successors among the Greeks and it is hard not to suppose that he had some foreign source. In the Babylonian texts, so ably edited by Thureau-Dangin, we find the principle of solving simple and quadratic equations and we cannot but suspect the descent of this tradition through the Sabaeans to Islam. The use of what we call the Arabic numerals, and the employment of sines in trigonometry, came to the Arabs from India, and it may well be that in Arabian mathematics the influence of Greece, India and Babylonia converge. Mohammed al-Khwārizmī (c. 900) is perhaps the most famous of Islamic mathematicians, and it is from the title of his book *Hisāb al-Diābr wa'l-Mukābala* that the word algebra is taken, while his own name is enshrined in the



—and also, on the eccentric circle, the position of the sun for each day of the year. To tell the time, the altitude of sun or star is observed and the network is rotated till the sun or star thereon falls on the appropriate altitude-line. The sun's position for the day will then fall on the radial line indicating the hour



word *algorism* formerly used for arithmetic in Arabic numerals. He is followed by a succession of great mathematicians and astronomers whose latinized names Alfraganus, Albatagnius, etc. show their influence upon the Western world. It is hard to say how much of Arabian mathematics is wholly original. The knowledge of the past was undoubtedly assimilated and developed, but it is questionable whether any Arabian mathematical ideas constitute a truly new departure.

The Arabs naturally concerned themselves with geography, for they had ranged wider than any people before them. Their scientific geography, as distinguished from accounts of distant lands, originated from the study of the *Geography* of Ptolemy. The House of Wisdom at Baghdad included an observatory. Their astronomers attempted to measure the circumference of the earth, as the Greeks had before them, and they prepared a map of the

world based on the lists of positions in the text of Ptolemy. Among the great geographers we must note some of the great encyclopaedists such as al-Kindī and al-Birūnī. The best of their maps were those prepared by al-Idrisī, for the Norman King Roger II of Sicily (1101–54). The principal advances made by the Arabic geographers were in the description of localities with which they commonly traded, but which were little known to the Greeks. Thus al-Idrisī incorporated in his maps information concerning the south-east coast of Africa which was gained on the trading voyages of the Emosaid family. The Far East was much better known to the Arabs than to the Greeks, though this increased knowledge was but imperfectly mirrored in their maps. They found it very hard to believe that the Greeks could be wrong and the errors of Ptolemy as to the form of Africa and India were perpetuated by the Islamic geographers and

handed on by them to the Latin West.

The sciences were introduced into Islam through the medical schools, and so it is not surprising that their medical studies were worthy of attention. We have already seen that the works of Galen and Hippocrates were among the first Greek texts to be translated. Arab medicine suffered from a lack of experimentation: they do not seem to have practised anatomy. On the other hand their clinical observation was acute and their repertory of drugs very considerable. As an example we may quote the greatest of Moslem physicians Abū Bakr Mohammed bin Zakariyā al-Rāzī, known to the Latins as Rhazes. A practising physician in the hospitals, first at his native Raiy near Tehran, then at the great *bīmāristān* of Baghdad, he looked at his patients and described what he saw. Not only was he a physician, but also chemist, physicist, and writer upon all the sciences—one of the earliest of the great encyclopaedists, of whom we shall have more to say. Avicenna (Ibn Sinā) who followed him is another universal genius. As a philosopher he ranks only second to St Thomas Aquinas, while his vast *Qanun*, an encyclopaedia of medicine, was the chief medical work of the Middle Ages.

Arabic medicine found its way very early to the Latins. Abū Ya'kūb Ishāk bin Sulaimān al-Isrā'īlī, known as Isaac the Jew, lived at Kairouan near Tunis and demonstrated his medical ability by living a hundred years (832–932). His Arabic treatises were translated into Hebrew and were among those translated into Latin by Constantine the African, and thus transmitted to the School of Salerno, earliest of Latin universities.

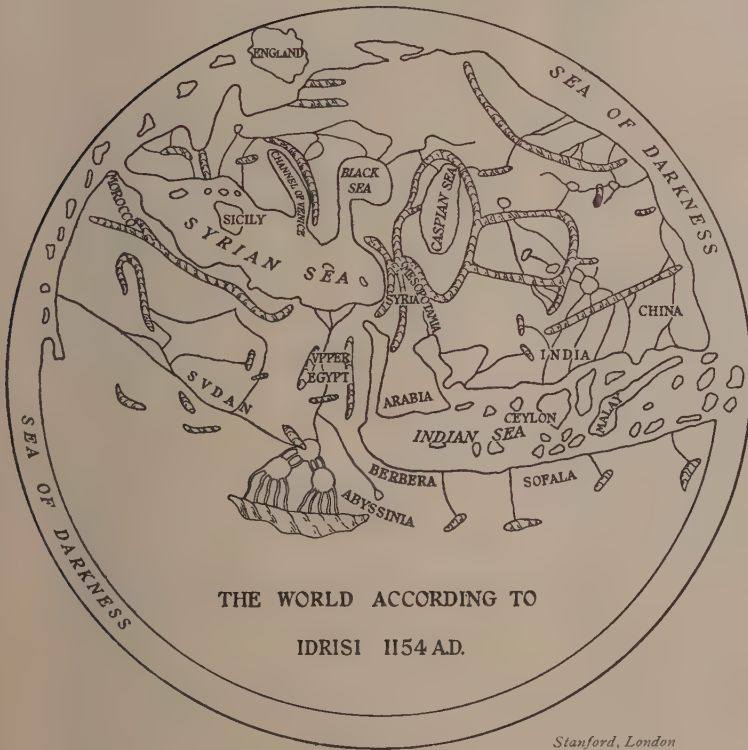
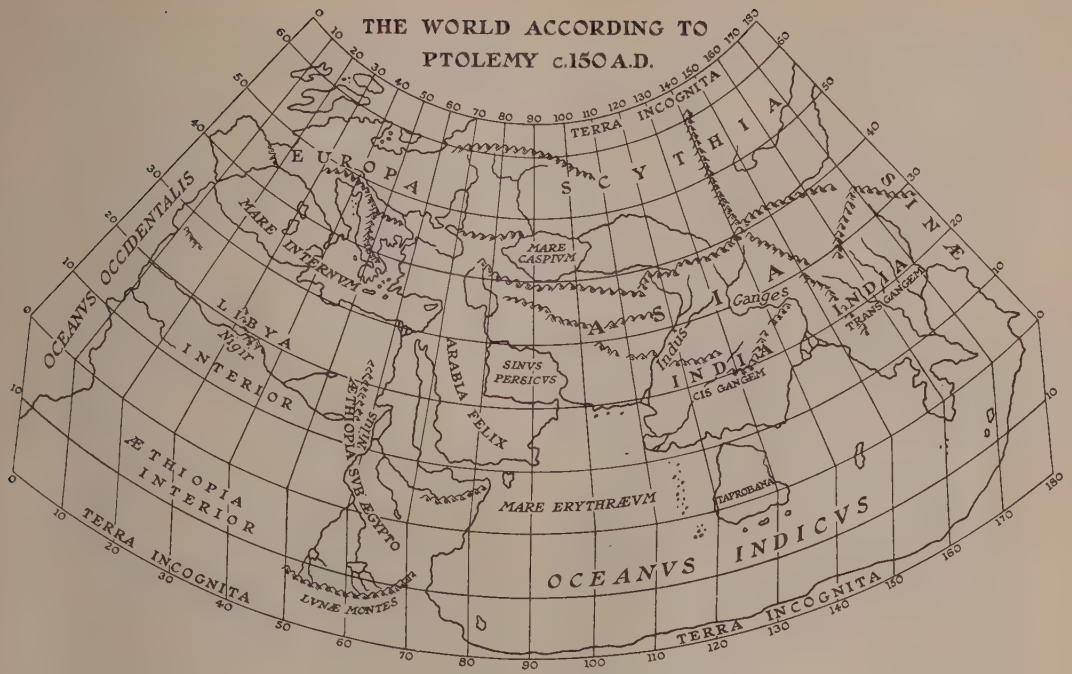
The physics of the Arabs did not amount to much, yet it seems to have exceeded the activities of the Greeks from whom it was derived, and of the Latins to whom it was handed on. Al-Bīrūnī (970–1038), the great geographer whose *Tārīkh al-Hind* (Journey to India) is a classic, was also a physicist. His delicate and accurate work on specific gravities was not improved on until the time of Galileo. Ibn Al-Haitham (Alhazen), born in 965, was another influential physicist. He followed in the steps of Euclid's works on optics and advanced beyond them. He studied lenses, reflection in curved mirrors, etc., and his book *Kitāb al-Manāẓir*, translated as the *Treasury of Optics*, had the greatest influence on the Western physicists, notably Roger Bacon and Witelo.

The problem of Arab chemistry is a complex one. The Alexandrian and Byzantine Greeks wrote numerous works on alchemy—

the supposed transmutation of metals—and these contain, on the one hand, practical accounts of most of the standard chemical technique employed up to the 18th century, and on the other, symbolic and seemingly religious matter, to our ideas very far sundered from the laboratory. Some of these texts were certainly translated into Syriac.

The Arabic alchemical texts show undoubted evidence of Greek influence, but at the same time differ much more from the known Greek originals than, for example, Arabian mathematical works differ from the Greek. There are some apocryphal stories as to the origin of Arab alchemy. We are told that the king Khālid ibn Yezīd, an Umayyad who died in 704, was instructed in alchemy by a Christian monk, Morienus or Marianus: but no known Arabic alchemical work can be referred to this period, nor were the profane sciences then in favour. We hear, also, much concerning the works of Geber. The Western world has possessed since the 12th century a Latin work ascribed to 'Geber, king of the Arabs'; a work which greatly excels the contemporary alchemical works by its practical character. This Geber is identified by the Arab authors with Jābir bin Haiyān, a pupil of the sixth Shī'ī Imām, who died in A.D. 760. On the other hand Jābir's alchemical work is not known to have been mentioned before c. A.D. 970, and it has been proved that the enormous mass of these works which appear under his name were written by a secret sect of natural philosophers who assumed the title of *Ikhwān al-Safā*, 'Brethren of Purity' or 'Faithful Friends'. These men attributed to science a purifying power; their work may be thought of as a synthesis of Greek chemical ideas with the neo-Platonic notion of 'emanation' and the Aristotelian theory of the elementary composition of matter.

Lastly, we should say something of Arabic philosophy. Translations of philosophical works of Plato, Aristotle, Plotinus and Proclus began in the 9th century. These were fused and transformed by a series of remarkable men, many of whose works later found their way in Latin versions to the West. Most of these were not only philosophers in the modern sense, but scientists of a high order. Thus Alkindi (about 871), Alfarabi (d. c. 950), Avicenna and Alhazen were all philosophers and men of science; Algazel (1059–1111) on the other hand is chiefly to be thought of as a theologian. Later in the West—Spain and Northern Africa—Averrope (Ibn Badsha), Abubacer (Abū Bokr or



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The maps of the world compiled by Ptolemy and al-Idrisi who, like other Islamic geographers, derived most of his geographical theories from the Greeks. Ptolemy did not leave an actual map, but a list of latitudes and longitudes of places, by the aid of which maps were drawn in the Middle Ages and later. That shown above is based on a version published at Rome in 1508. Idrisi's map was executed for Roger II of Sicily (1101-1154) and was engraved upon a disc of silver. It is here transcribed and translated for comparison with Ptolemy's view of the world

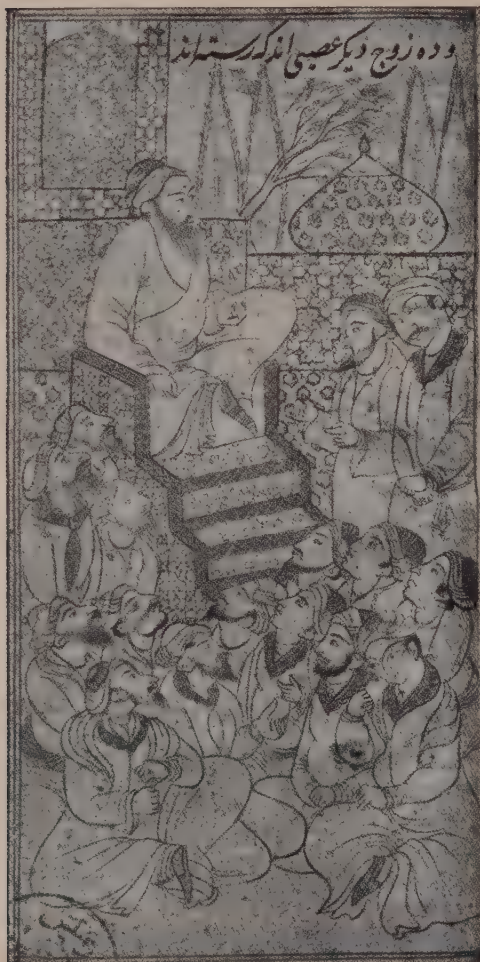
Ibn Tufail) and Averroes (Ibn Rushd) carried on their work. The Arabians absorbed Greek philosophy, and produced an Aristotelianism much coloured by neo-Platonic ideas. Their world-view shows us one God, author of the Universe, from whom descends a ladder of cosmic intelligences inhabiting each of the heavenly spheres down to the lowest, the sphere of the moon, which is nearest to the terrestrial world. In this lowest sphere, they thought, there dwelt one active intellect common to all individual

souls, which participate in it; with this intellect it was possible to achieve a mystical union.

All this is somewhat distant from the Greek Aristotle that we know, and it is remarkable how the Scholastics, such as Albertus Magnus and Thomas Aquinas, succeeded in discarding these Islamic extravagances and coming near to the thought of Aristotle himself.

To sum up, we cannot fail to see the Arab culture as derived from and dependent on the Greek. Greek ideas gave to Arabic culture the forms to which all matter that the Arabs received from elsewhere was subdued. Islam did not add much to the Greek heritage that it received, and we must regard the transmission of the thought of Greece to mediaeval Europe as being the principal contribution of Moslem culture to the world's intellectual development.

From about A.D. 1000 the knowledge that the Arabs had borrowed from the Greeks began to filter into Western Europe, through the few centres of learning where Arab and Frank were both tolerated. First of these was Southern Italy and Sicily. Translations of Arabic texts were made for the medical school of Salerno as early as the 11th century: in the 12th and 13th, the rulers of Sicily—notably Frederick II, *stupor mundi et immulator mirabilis*—employed translators on this task. In Spain likewise, where Islam met the Christian world, there was the same activity, culminating under Alfonso the Wise (1252–1284). It was rare for Arabs to know Latin or for Europeans to know Arabic: the intermediaries who knew both tongues were for the most part Jews. The translations once made were carried all over Europe by the travelling friars who were wont to move freely from one religious house to another and who were the principal recipients and teachers of every form of learning. So we may end by contemplating the long journey of the Greek text, written in Hellas or Alexandria, carried to Byzantium, translated into Syriac, carried to Edessa, Nisibis, Jundai-Shāpūr. Then the manuscript is brought to Baghdad, translated from Syriac to Arabic, copied and brought at last to Spain or Sicily. A Jew translates it into Latin—possibly by way of Hebrew—and the translation is eagerly copied in the cloister-scriptorium of some southern monastery. Copies are carried by friars, tramping across Europe from monastery to monastery, to become the prizes of their libraries, and if spared by the chances of fire and theft, rain and ruin, now at last to rest in the warm dry cellars of the Bodleian or some other library.



Reproduced from 'The Legacy of Islam', O.U.P.

Avicenna giving a lecture on anatomy. Note that no practical demonstration accompanies the lecture. From a 16th-century MS of Mansūr's Anatomy (composed in Persia about A.D. 1400) in the collection of Dr Max Meyerhof

The Green Army has Grown Up

by E. M. BARRAUD

WHEN I look back on the Land Army as it was when I signed the form in the National Service Handbook, in the spring of 1939—yes, *before* the war—and as it is today, I am amazed, and more than a little proud, because I feel it is largely due to us old-stagers that the Land Army stands where it does today.

I was not interviewed, I presented no medical certificate of fitness, I had no training; my uniform reached me piecemeal (we had no greatcoats the first hard winter of the war). We had only the standard bank holidays and no travel vouchers if we could get away; when clothes rationing was introduced we surrendered a large part of our coupons for uniform; and we were paid 28s a week gross. Above all, at best we were merely tolerated on the farms; for the most part we were frankly regarded as wartime inconveniences, second only in nuisance value to the blackout.

We survived. That grimmest of winters saw some of us weeded out, but the rest kept on. We began to learn, to find our particular niches on the job. Our employers and work-mates came to realize what we simply could not, physically, manage and what we could do at least as well as men, sometimes better. We began to specialize, particularly in dairy work. We began, in fact, to come into our own. I know I am giving us a pat on the back, but that was one of the things first we learned on the land: if you don't stand up for yourself, no one else will! And it was worth it.

Look at the Land Army now.

Recruits sign on for only two years, against our indefinite 'for the duration'. Where an employer cannot train his own girl, she can be trained at Government expense on an approved farm for four weeks, all the time receiving a personal allowance of 18s to 22s 6d a week. She is then found employment and lives either in a well-equipped hostel or in supervised billets. She has a week's paid holiday in addition to the standard holidays, and travel vouchers when she goes on leave. The Benevolent Fund stands solidly behind her in case of illness or other hardship. And her rate of pay is now 50s for a 48-hour week.

The Land Army has learned from its mistakes, above all it has learned from our early grim apprenticeship.

Get right out of your mind any idea of glamour about Land Army life and work; there is no room or time for that. The work

is tough, it requires a high degree of persistence as well as skill of no mean order. There is room for the girl who loves animals and is prepared to learn the scientific side of animal husbandry as practised today. There is room for the mechanically-minded girl who may be driving a tractor, an excavator, a gyro-tiller or any one of the hundreds of modern implements of mechanized farming. There is room for anyone except those who think 'hay-making must be rather fun' and life on a farm one long summer holiday!

As to the fascination and satisfaction of farm life and work, that is the realest thing I know. It is not a romantic, high-faluting thing, but a deep-down fundamental fascination and satisfaction that persists even after a solid month of muck carting or six years of early rising to do the morning milking. You feel yourself part of an age-old continuity of tradition in a life and job that is always essential, come war come peace, come poverty come plenty. It was some dim instinct that this was so which made me join the Land Army in those critical months of peace, and despite all the hardships and the paltry *financial* reward, I had no regrets.

The girl who joins the Land Army today can feel hugely more confident. Apart from the general training provided for any new recruit, those who have had a year or two's experience and found their own particular field of work can take courses to specialize. I was at a training centre run by the Ministry through the local War Agricultural Executive Committee only a short time ago. Forty Land Girls, most of them with more than two years' practical experience behind them, are taking a 32-week course in general agriculture. The syllabus includes animal husbandry, dairy work, general farm crops, machinery maintenance and minor repairs, bee-keeping, gardening (general), rural domestic economy and farm secretarial work.

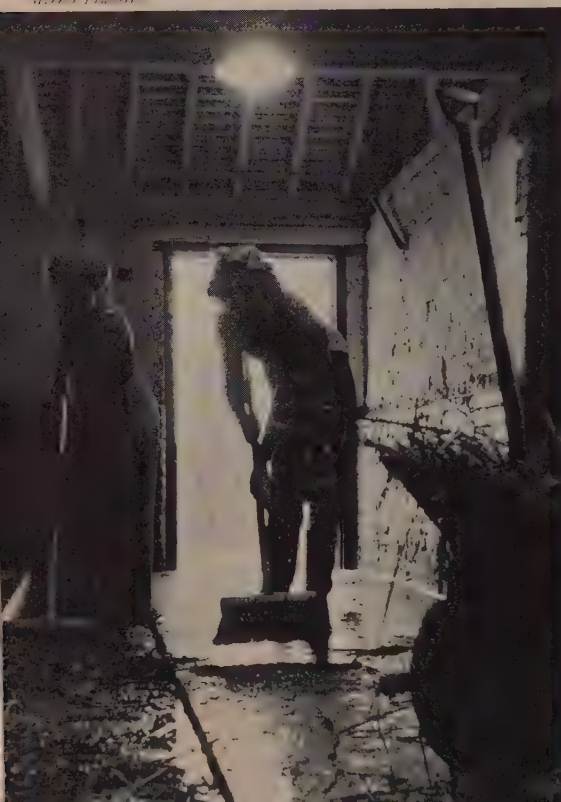
In my early days I would have given the earth for a chance like that. Farmers may revert to employing mainly men, but if a farmer can get someone to do the job he hates most of all—the clerical side of his work—and someone who can also give a hand on the farm, either in the dairy or out in the fields, there will always be room for the right kind of girl, with far better prospects than anything envisaged by the little band of adventurers that we were in 1939.



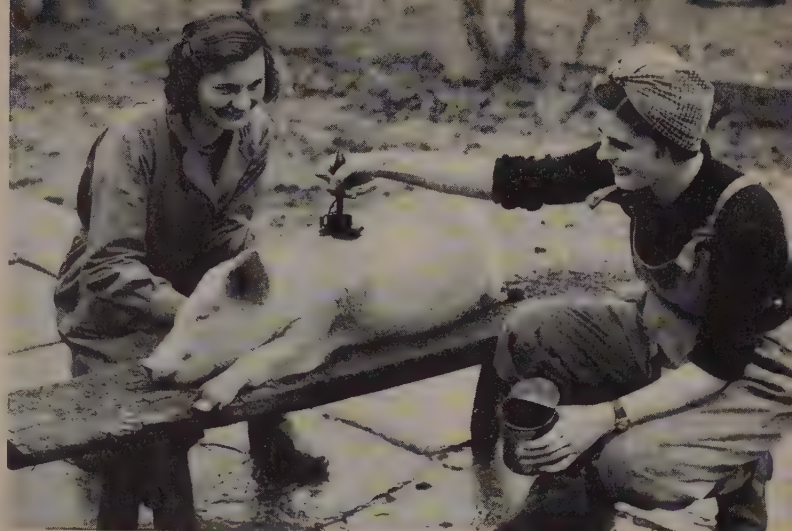
Milking Time



Illustrated



Animal husbandry is the prime concern of British agriculture and will remain so as long as we draw our main supply of cereal foodstuffs from overseas. Training in the care of animals is therefore also a prime concern of the Women's Land Army and girls who are animal-lovers soon find themselves chosen for this work. If the town-bred girl's first anticipatory reaction is one of pleasure at handling the dear little calves or piglets, her second may well be less favourable on discovering how dirty they are, how hungry, and how liable to all sorts of ailments unless carefully watched. The pretty little things, moreover, are but a small proportion of her charges. But in the end she will find a deep satisfaction in producing so much that her sisters only meet in shops: the milk, meat, wool and hides that Britain consumes in such enormous quantities. This satisfaction will help her over many distasteful jobs—the muck-clearing, the constant labour of preparing food, and the messy if sometimes comic business of administering curatives to obstreperous animals. While some jobs need to be done alone and some in company, every individual on a farm is a 'key man' where animals are concerned



FOX & HODGSON



Keystone





B. K. Lower

If individual skill counts greatly in the care of animals, it is just as important in such work as fruit-farming, horticulture and market gardening, though the touch required is of a different order. No one who has mastered the arts of pruning or grafting, and seen her branch bring forth good fruit, will fail to taste the pride of true craftsmanship. But there is pride also in labour involving a greater degree of communal effort—



Ph. 2



—the hand-hoeing that has nursed many a dry upland into successful cultivation; the ditch-clearing that has rendered fertile much unproductive marshy ground. Such work needs other personal qualities, those of a team with a leader—the forewoman who can help them to overcome, by changing jobs, the agonies of unaccustomed muscles or to convert apathy into the contentment of mind which physical labour can bring



Central Office of Information

One kind of team work is notably supporting animal husbandry at the present time: that which consists in using mechanical aids to conserve all possible animal fodder that our soil will grow, in view of the world shortage of the concentrated foodstuffs which we formerly imported. Here a team is treading down silage—freshly cut grass interlayered with molasses, which is stored in summer and matures under heavy pressure for use in winter



Fox Photos

A similar purpose is served by the machinery for harvesting and baling hay. The Land Army needs plenty of girls who possess the taste and aptitude for handling and repairing machinery; their urge to understand 'how it works' can afford an essential supplement to the mechanical skill of the British farm worker, who uses more machinery per acre than any other farm worker in the world



Fox Photos



The Noble Faubourg

by ALAN HOUGHTON BRODRICK

THE 'Noble Faubourg' or *Faubourg Saint-Germain* still justifies its name, for there are in it more private houses of the late 16th and 17th centuries lived in as they were built to be lived in than in any other part of Paris, or indeed in any other city in the world. There are, of course, magnificent old houses scattered about in the ancient quarters of the Right Bank but for the most part they are degraded and disgraced.

The VIIth arrondissement of Paris comprises what in old France was the Faubourg Saint-Germain, but today much of it is either middle-class, commercial or flashy modern. For the purpose of getting an idea of Old Régime magnificence we may confine ourselves to the eastern part of the VIIth arrondissement and indeed to the *rues de Grenelle, de Varenne* and Saint-Dominique with their lateral connections.

At the end of the 16th century all this level ground to the west of the old city limits was given over to market gardens, farms and rough shooting. The heath, generally known as the *garnelle*, was the property of the very wealthy Abbey of Saint-Germain des Prés except the strip known as the *Pré-aux-Clercs* that belonged to the University. From these two antique ownerships come, of course, the names 'Faubourg-Saint-Germain' and '*rue de l'Université*'.

In the 17th century the completion of the Luxembourg Palace (now the Senate building), the temporary return of the Court to residence at the Tuileries and above all the replacement in 1632 of the inconvenient old ferry by a wooden bridge known as the *Pont Royal*, all led to the 'development' of the Faubourg Saint-Germain. By 1684 Germain Brice held that it was richer in great houses than any other part of Paris—and the best was yet to come. In 1685 the wooden Pont-Royal was replaced by a stone one, a most commodious and modern structure lit after nightfall by a row of cressets on either side. There was no other way of crossing the Seine except by boat downstream from the Pont-Royal. The foundation of the Invalides and later that of the *École Militaire* pointed the way to further extensions.

Under the Regency the *rues de l'Université, Saint-Dominique, de Grenelle* and

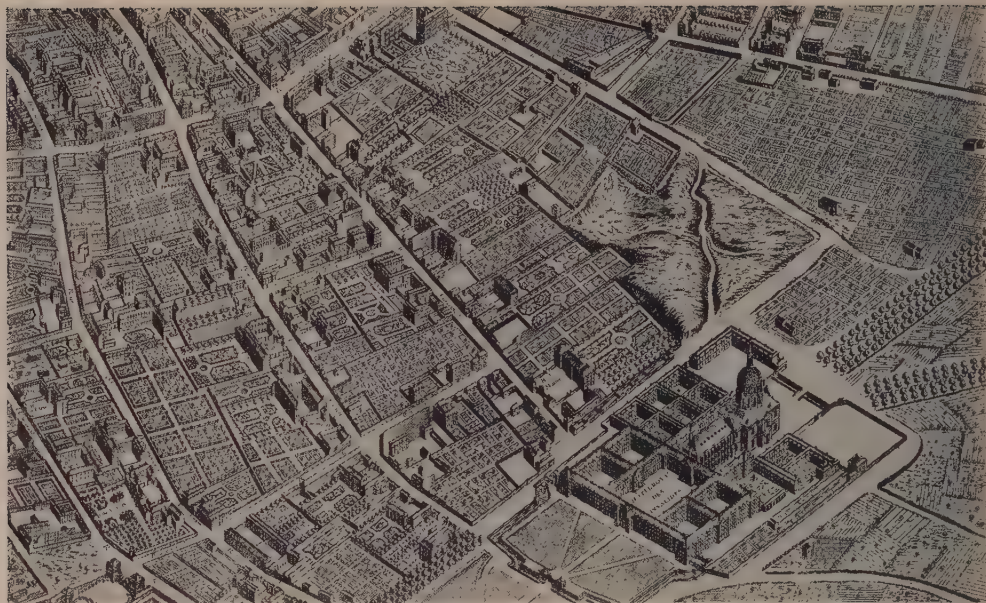
de Varenne took on their shape and importance as we still know them. By the time that the map known as 'Turgot's' was completed in 1739, many mansions had not yet been built, for the Noble Faubourg reached its apogee under Louis XVI. There was no longer a 'Sun-King' nor a 'Well-Beloved' at Versailles. There was a dull King and an unpopular Queen. As Marie-Antoinette herself said pensively, she was only "Queen of Versailles". The great nobility felt freer in their own Paris castles than in the King's at Versailles.

The Revolution struck the Faubourg a blow but did not destroy it. The quarter kept all its prestige. The Embassies still remained and the new parvenus (there had always been such under the Old Régime of course) and the new Napoleonic nobility, the Massénas, the Feltres, the Murats and Madame Mère herself all lived in the Noble Faubourg.

At the Restoration the smart part of Paris was the Noble Faubourg. Here foreigners liked to stay when they could, here was something unique in Europe. 1830 was a signal for decay. Louis-Philippe was abhorred by the *ancienne noblesse* and all who would be thought and accounted such. The householders of the Noble Faubourg retired to their country-places. The 'Citizen-King' leaned upon the money-men of the Right Bank City who spread their palaces and houses in new quarters where they would have to endure no invidious comparisons. So grew up the new faubourg Saint-Honoré, the sections of the VIIIth and XVIth arrondissements.

With Napoleon III came Baron Haussmann, cutting his great swath of the Boulevard Saint-Germain through Old Paris, and the Noble Faubourg was left like a museum-piece. What the future of all these magnificent palaces will be no one can guess. Up to now, owing to the French habit of many members of a family living under the same roof, the character of the faubourg has hardly changed; but more and more of its buildings have become banks, museums or Ministries. Let us hope that the Parisians will ensure that the fabric of this precious heritage is preserved, even if its atmosphere be doomed to vanish.

1. The *Hôtel de Maillebois*, 102 *rue de Grenelle*, was built in 1724 by Delisle-Mansart, but the pale grey 'country-house' one now sees—a charming, dignified and comfortable mansion of Old Paris—is the work of Antoine who in 1787 completely modified Delisle-Mansart's original design



A reproduction, greatly reduced, of part of the 'Turgot' map (it was really drawn by Breteix in 1739) covering the heart of the Noble Faubourg. Some of the houses illustrated herein are recognizable



Stanford, London

The same area of modern Paris. Despite the great cuts made by Haussmann, Napoleon III's town-planner, the essential features of the Noble Faubourg are clear—e.g. the Invalides, the Hôtel de Biron and the War Ministry. It should be remembered that the boulevards Saint-Germain and Raspail are not a hundred years old: otherwise the only major change in the lay-out was effected when the rue Barbet de Jouy was built and the undulating meadow near the Invalides disappeared

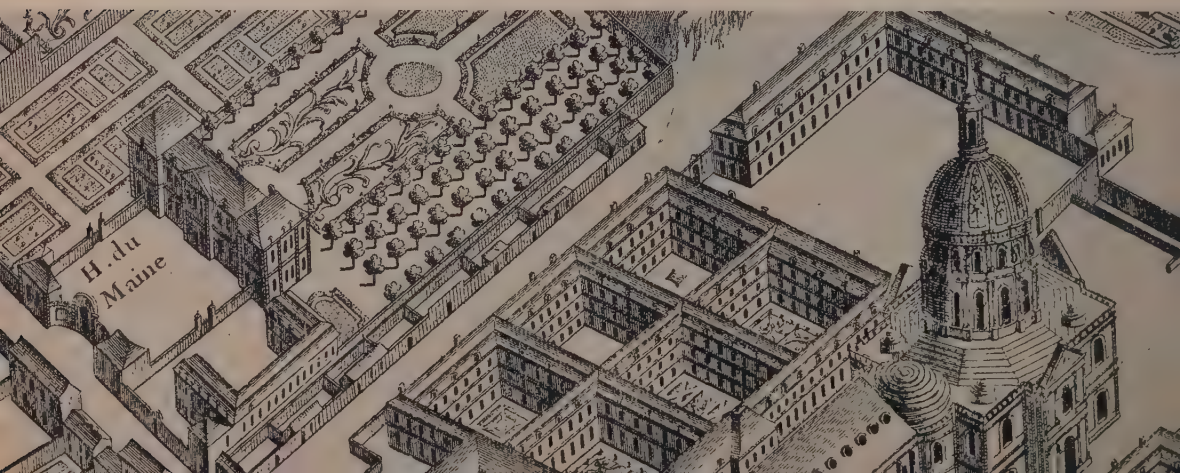


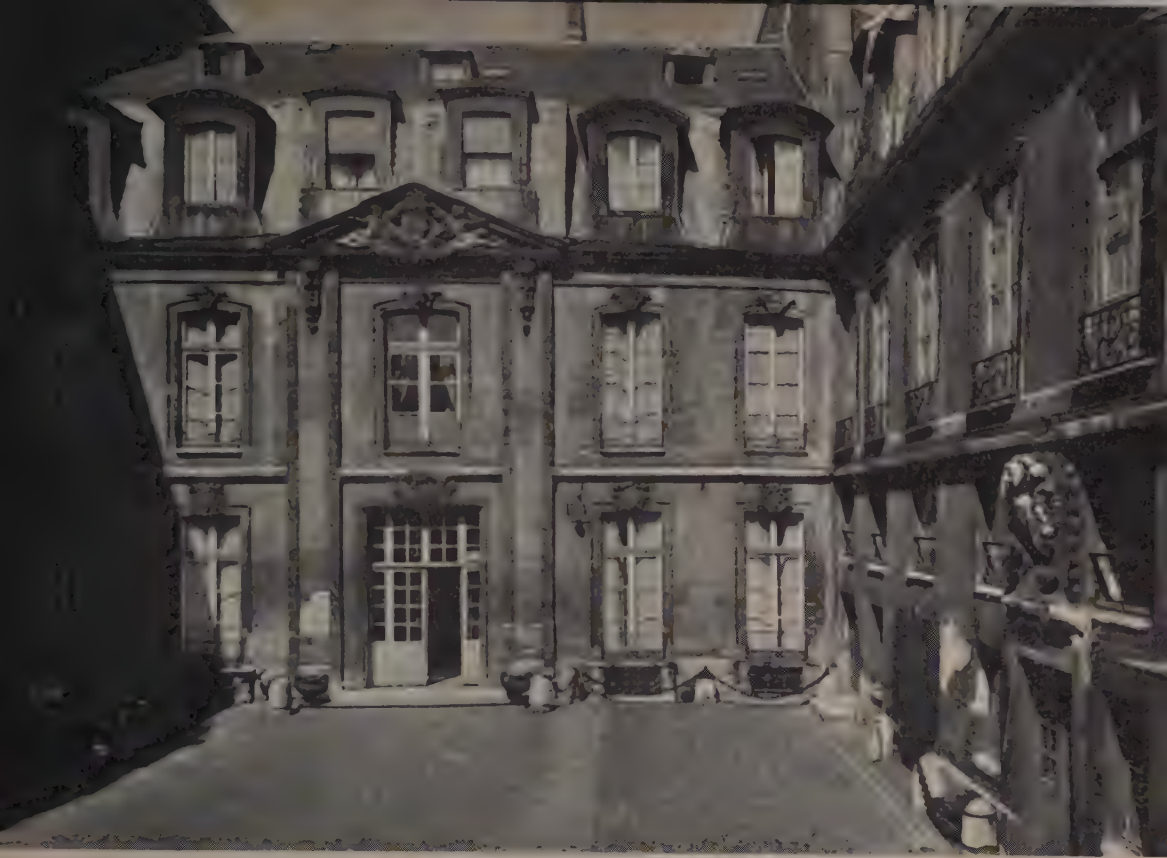
Photographs by courtesy of the Commissariat du Tourisme

2. The house at 85 rue de Grenelle was built in 1718 by Aubert and Leroux. For a time it was the British Embassy (1724-30) while Sir Horatio Walpole, afterwards Lord Walpole of Wolterton (younger brother of Sir Robert Walpole), was ambassador. After being for a number of years in the 19th century the mansion of the Bésiade family, ducs d'Avary, the place was sold in 1920 to the Dutch Government and is now used as the residence of the Netherlands envoy at Paris



3. The great Hôtel de Biron was built from 1728 to 1731 by Gabriel and Aubert for one Abraham Peyrenc, a successful wigmaker who had been ennobled as 'Peyrenc de Moras' and whose son was for some time, under Louis XV, Minister of Marine. His widow sold the place to the duchesse du Maine (granddaughter of the Great Condé and widow in 1736 of the duc du Maine, son of Louis XIV and Mme de Montespan) who here held a court of poets and wits until her death in 1753 when the mansion was sold to the Marshal-Duke de Biron. He died five years later but his widow continued to reside in the house until her death in 1794, having lived through the Reign of Terror. Later inhabitants were a Papal Nuncio, a Russian Ambassador and (from 1820 to 1904) the Sacré-Cœur convent. In 1910 the house was bought by the State and resumed its best-known name of Hôtel de Biron. After some years of neglect the gardens were redesigned and it was opened to the public as the Rodin Museum. (Below) The Hôtel du Maine (de Biron) and the Invalides as shown on the 'Turgot' map (actual size)





4. No. 56 rue de Varenne, built in 1727 for Mme de Gouffier, marquise de Thoirx, is generally known under the name of Chaumont de La Galaizière, who were the owners from 1771. The house is a sturdy, dignified and conservative example of Louis XIV tradition lasting into Louis XV's reign



5. No. 142 rue de Grenelle is almost as far west as the boulevard des Invalides and was built by the architect Delamair in 1750 as the 'Petit Hôtel de Chanac'. It is in the purest and most exquisite style of Louis XV's reign and retains much of its original wood panelling. In 1860 and for the rest of the Second Empire it was the town house of Lucien Bonaparte, nephew of Napoleon and son of Lucien Bonaparte, prince of Canino. This cousin of Napoleon III was a man of quiet tastes, addicted to philology. He died in England in 1891



6. The little 'rue Monsieur' (named after Monsieur the King's brother) was opened in 1778 between the rue de Babylon and what is now the rue Oudinot. The house at No. 12 rue Monsieur was built by the famous Brongniart in 1786 for Mlle de Bourbon-Condé and is without doubt his finest work (his buildings include the Paris Bourse or Stock-Exchange). This little Hôtel de Condé is the perfect example of a Louis XVI mansion with the interior unchanged in the last 160 years. The gardens of the house, here seen from the semi-circular saloon, still reach down to the boulevard des Invalides



7. The Hôtel d'Auroy at 58 rue de Varenne was built or completed in 1750 and the simple elegance of the entrance and the sweep of the stairs suggest the best traditions of Louis XVI. It is probable that here, as in so many of the Noble Faubourg's houses, a good deal of interior redecoration went on from time to time. In 1770 the place belonged to a branch of the notable La Rochefoucauld family and under the First Empire it was the property of General Rampin. It achieves effects still sought by interior decorators

8. The old Hôtel de Boisgelin at 47 rue de Varenne was erected in 1787 by Parent for the then marquis de Boisgelin. It is in the most gorgeous Louis XVI taste, the staircase being lined with red - and - yellow - veined marbles. Since the house belonging to the duc de Doudeauville (of the La Rochefoucauld family) was bought by the French State to accommodate the new Italian Embassy, as part of an arrangement with Mussolini whereby the French retained as their embassy the Palazzo Farnese at Rome, the old Hôtel de Boisgelin has been the town-house of the duc de Doudeauville







9. (Above) No. 69 rue de Varenne was built by the architect Le Blond from 1708 to 1714 and later in the 18th century became the property of the duchesse de Châtillon who largely rebuilt the place. Before the Revolution it was in the possession of Boucher d'Orsay of a wealthy commercial family that had acquired a title of comte and land along the banks of the Seine. It is from these Boucher d'Orsay that the famous quai d'Orsay takes its name and not from the 'Count d'Orsay' of Victorian times. At the Revolution, the owner having fled, No. 69 was confiscated and in 1796 was the French Ministry of War. It was afterwards the property of Barbet de Jouy, a curious figure of the Restoration, who cut through the gardens of his house and some others the fashionable street still known as the rue Barbet de Jouy.

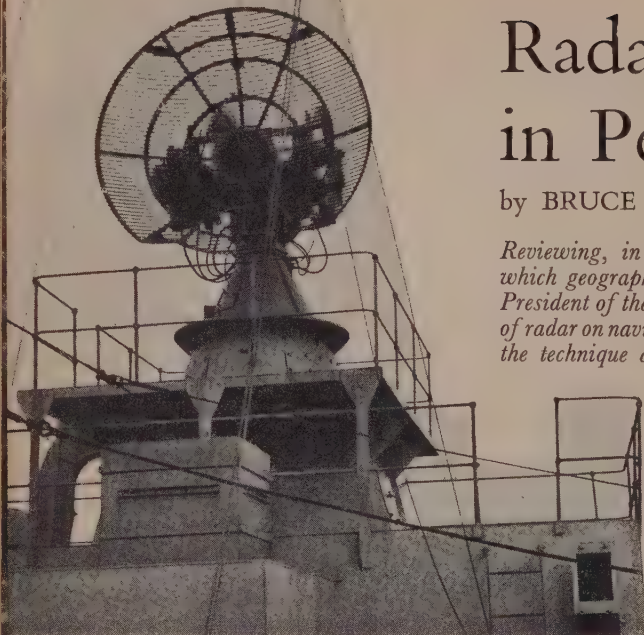
10. (Opposite, above) The garden of No. 79 rue de Grenelle, which was built in 1713 by Robert de Cotte for the duchesse d'Estrées and which, though it has had several owners and has been for many years the seat of the Russian Embassy, all lovers of old Paris still call the Hôtel d'Estrées.
 11. (Opposite, below and right) The Hôtel de Chanaileilles, at the corner of the rue of the same name and the rue Vaneau, is a charming example of an 18th-century folly as perfect in its way as Bagatelle or the Petit Trianon. Ouvrard the crook financier, usurer and army contractor gave it to his mistress Mme Tallien, the famous Thérèse Cabarrus, who here had her Paris house until she died—highly respectable and by her third marriage 'princesse de Chimay—in 1835



Radar and its Uses in Peace

by BRUCE M. ADKINS

Reviewing, in our December 1945 number, the directions in which geographical exploration may be expected to develop, the President of the Royal Geographical Society referred to the effects of radar on navigation by sea and air. Mr Adkins here examines the technique and limitations of this and other uses of radar



As long ago as 1925, in a lecture delivered to the American Institution of Radio Engineers, Marconi described the possibility of locating objects by means of radio waves reflected from their surfaces. Even in those days it had been observed that electrically conducting bodies, when placed in the path of a radio transmission, would cause a portion of the energy to be returned in the direction whence it came, while a further portion would be deviated from its original course and scattered in many new directions.

The immense practical possibilities of this phenomenon were first employed some two years later, when the altitude of an electrically conducting layer of ionized gases in the upper atmosphere, the Heaviside layer, was determined by means of radio energy reflected back to the earth. It is a far cry from this early experiment in radio-location to the radar equipment of the present day, yet the broad principles employed remain unaltered, and a brief examination of these is necessary to explain the progress which has been made, as well as its limitations.

Nearly everyone has, on some occasion, stood in a valley or along the seashore, and observed the echo produced by a shout or a hand-clap. Moreover, it will probably have been noticed that the time interval between the original shout and the echo varies with the position of the observer in relation to the cliffs or other near-by high ground.

A modern radar aerial fitted aboard ship. The large parabolic reflector produces a narrow radio beam in the same way as the reflector of a motor-car headlamp concentrates the light into a single direction. This type of aerial enables very accurate determination of both the bearing and the elevation of the target

This occurrence is explained in the following way. When the observer shouts, he creates a disturbance in the air about him, which travels away from him in much the same way as ripples travel outwards across the surface of a pond when a stone is dropped into the water. The disturbance in the air will eventually reach the side of the cliffs or hills, where, like a rubber ball bouncing off a wall, it will 'bounce' back towards the observer. This reflected disturbance now travels, again in ever-widening 'circles', until it reaches the observer's ears, where it is manifested as an echo of his original shout.

Now if the observer has noted the time elapsing between his shouting and his hearing the echo, he will know the time taken for the disturbance to travel from himself to the cliffs and back again, so that, if he knows the speed at which sound travels through the air, he can calculate how far away from the cliffs he is standing.

Exactly the same principle of time measurement is employed in determining the range of an object by means of radio wave reflections. However, whereas sound waves are physical disturbances in the air, travelling at the comparatively low speed of 1100 feet per second, radio waves are of a somewhat different nature, and travel in a medium called the ether at a speed which is the highest natural velocity known, namely, 186,000 miles per second, or 300 million metres per second.

A 'bedstead' aerial array aboard ship, so called because of its appearance. Aerials of this type are employed for long range radio-location, but do not give such accurate bearing indication as those using a parabolic type of reflector

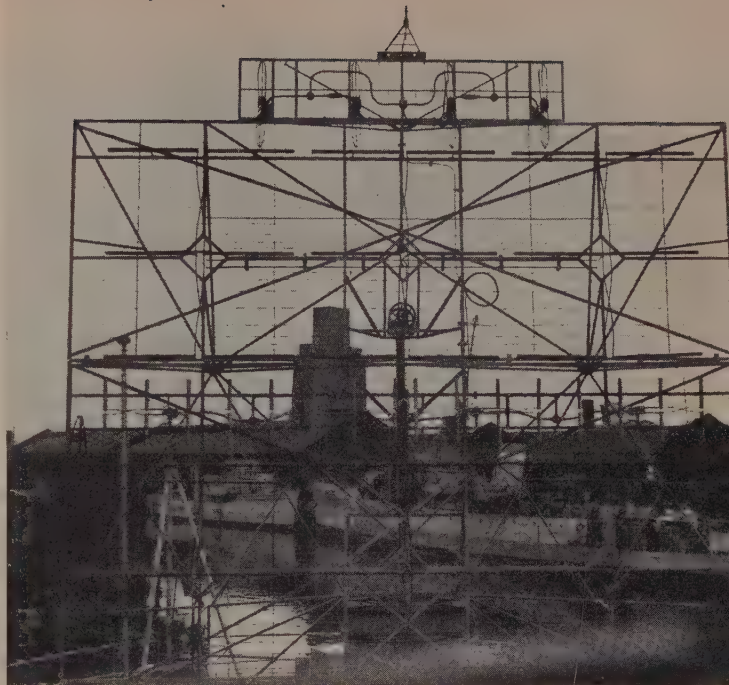
In order to use radio waves to measure distance by the same method as that of the sound echo, therefore, it is necessary first of all to have some device whereby a short burst of radio energy, equivalent to the shout, may be radiated, and secondly, to have some very accurate 'stop-watch' for measuring the very short time between the creation of the burst of energy and the receipt of its 'echo'.

Reverting for a moment to the sound analogy; supposing the observer, when he shouts, cups his hands round his mouth to direct his voice towards some particular point. If this point is in the same direction as the cliffs, he will receive a louder echo than before, for he will have produced a greater disturbance in the air along the path towards his target. If, however, he had directed his voice away from the cliffs, the echo would have been much weaker, and might not have been audible at all. If, therefore, he 'beams' his voice in different directions until he observes the loudest echo, he will know that he is shouting in the direction of the cliffs.

Similarly, if a radio transmission is concentrated in one direction, or 'beamed', it will produce the greatest 'echoes' from objects lying in the beam, and little or no echoes from other objects. Hence the bearing, as well as the range, of a target may be determined.

From this brief outline of the principles of radio-location it will be seen that two of the essential requirements are that a well-defined radio 'beam' should be produced, and that this beam should travel in a straight line between transmitter and target.

The accuracy with which these two conditions can be fulfilled is largely dependent on the wavelength of the radiation. Radio waves are of a similar nature to light waves and many other vibrations which occur in the ether. All these waves have the same speed of travel in space, that is 186,000 miles per second, and the only essential difference between them is wavelength, that is, the distance

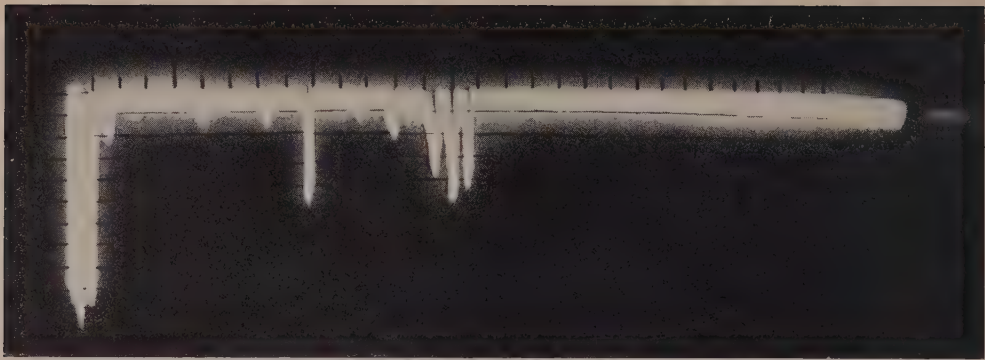


travelled during one single complete vibration, or 'cycle'.

We are all familiar with radio broadcast waves between 200 and 2000 metres, as well as the 'short waves' between 10 and 100 metres. Radar waves lie in a band just below the 'short waves', extending from 10 metres to 1 centimetre and, below this band again, are infra-red radiations, visible light (wavelengths from eight to four ten-millionths of a metre), ultra violet, X-rays, gamma rays (emitted by radio-active substances) and cosmic rays (radiations from outer space). These last have wavelengths as small as one ten-million-millionth of a centimetre.

There are numerous reasons for using these very short waves (in comparison with normal radio waves) for radar, and three of the most important are, firstly, that they are reflected far more completely from ordinary objects, such as aircraft or ships; secondly, that it is very much easier to concentrate them into an accurate and narrow beam; and thirdly, that the accuracy with which they can be used to measure distance is much greater. These three properties become progressively better with increasing frequency (decreasing wavelength), and it is therefore advisable, for radar purposes, to use the very shortest wavelength possible.

A further important advantage of very short waves is that, for a given aerial height,



A simple 'line' radar presentation on a Cathode Ray Oscillograph. The large deflection at the left hand end of the 'trace' is the initial pulse of the transmitter. The numerous 'echoes' half way along represent the coastline of the Firth of Forth, while the large echo between is a big ship

the shorter the wavelength the nearer to the ground is it possible to radiate a beam of energy, and therefore the nearer to the ground can objects be radio-located.

There are, however, certain factors which set a limit to the minimum wavelength which may be employed, and these limitations vary with the particular purpose for which a radar is designed.

Firstly, very short waves travel in almost true geometrical straight lines, and are therefore unsuitable for ranges greater than the optical range which is limited by the earth's curvature. Longer waves, however, tend to follow the surface of the earth beyond the horizon. Such wavelengths, therefore, are more suited for very long-range radio-location, although the accuracy with which location can be achieved is not as great as shorter waves would provide at closer ranges.

Secondly, the longer wavelengths are unaffected by clouds and rainstorms, while very short waves are partially absorbed, and partially reflected, by these.

Thirdly, and opposed to the use of the longer wavelengths, is the extreme difficulty of confining them into narrow beams, on which depends the accuracy of bearing determination. Even for a comparatively wide beam, moreover, the aerial array required is a very large and bulky piece of equipment, and is unsuitable for use anywhere but in ground stations or large ships.

Fourthly, the lower limits to wavelength are dictated by the fact that some of the natural gases in the atmosphere, notably oxygen and nitrogen, absorb waves in certain particular bands, and therefore preclude their use. Water vapour also effects considerable absorption at certain wavelengths.

A further difficulty with very short waves is due to the fact that their reflections from a target may return to the radar by more than one path. There may be the direct path, and also other paths where the beam is first reflected towards the ground, or sea, then being again reflected towards the radar. Waves travelling by such different paths, involving different distances, may arrive back at the radar with varying relationships to one another, and the phenomenon of interference can occur in the same manner as with light, giving regions in which a target becomes 'invisible'.

Having considered the fundamental requirements of radar equipment, it will be of interest to follow the development of practical apparatus from its early conceptions to the present-day technique. The first use of short bursts or 'pulses' of radio energy was in 1931 by Sir Edward Appleton and Dr. Builder, who were investigating the Heaviside layer. On this occasion use was made for the first time of a cathode ray oscillograph for measuring the time interval, which method of 'presentation' is now almost universally employed in radar equipment.

The first serious attempt to radio-locate aircraft, using a pulsed transmitter, a receiver and a cathode ray oscillograph, took place in 1935 under the leadership of Sir Robert Watson-Watt. Considerable success was achieved and, from then onwards, radar in its present form began to evolve rapidly.

The early radar sets were not very accurate for many reasons, of which perhaps the most important was the fact that comparatively long wavelengths were employed. Moreover, the first transmitting aerials were not directional, and bearings were determined by

standard direction-finding methods applied to the received echo only. This resulted in a considerable waste of transmitted power, which in any case was far below the optimum amount required.

A second reason for the comparative inaccuracy, particularly at short ranges, of the early radar sets was the long duration of the pulse, or burst of energy, which was used. We have seen that a radar equipment measures range by indicating the time interval between two occurrences, the creation of a pulse, and its reception after it has been returned from the target. If this time interval is so short as to be comparable with the time duration of the pulse itself, evidently the accuracy with which measurements can be made will be reduced. In the limiting case, when the time interval to be measured is equal to or less than the pulse duration, its measurement becomes impossible, for the two indications on the cathode ray tube trace will be 'run together'.

While the development of shorter wavelength and shorter pulse duration techniques was proceeding, much attention was devoted to the methods whereby radar information was presented to an observer.

The original use of a cathode ray oscillograph presented 'targets' along a line, either by a momentary deflection of the line or by an increase in its brightness. This method of presentation enabled accurate measurement of range by observing the distance of the target indication from one end, which was made to correspond with the transmission of the initial pulse. It did not, however, indicate bearing, and some additional indicator was necessary to show in which direction

the beam was pointing.

An important advance upon these methods of presentation was the use of the cathode ray tube to indicate simultaneously both range and bearing, the target appearing on the circular face of the tube as a bright spot, whose distance from the centre indicated range, and whose angular position from the centre showed bearing. This form of presentation, known as the 'Plan Position Indicator' (P.P.I.), produces a complete map of the surrounding terrain, on which hills, tall buildings and other reasonably large objects appear as patches of bright light against the dark background of the tube surface. Of course, the accuracy of the 'map' and the 'definition' of the picture are primarily dependent on the same factors as have already been considered, namely wavelength, narrowness of beam, and pulse duration, but all these have been developed to give a high degree of precision, as may be seen from the photographs in figs. 1 to 4.

These photographs illustrate well the effects on accuracy of various factors which have already been discussed. Figs. 1 and 2 depict part of the English coastline near Portsmouth, and are pictures taken aboard a ship in which the same coast was examined by two different radars. The radar from which fig. 1 was photographed had both a wider beam and a longer pulse duration than the one which produced fig. 2, and the difference between the two pictures is easily seen. While fig. 1 is largely a confused mass of light, in fig. 2 the coastline is easily discernible, and individual ships, etc., in the vicinity are clearly marked.

Fig. 3, which unfortunately is not of the



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same coast, shows the very marked improvement obtained by using a shorter wavelength. This photograph is from a radar having a wavelength of about one-third that used for figs. 1 and 2, and also having an extremely narrow beam. The map is of the entrance to the Thames Estuary, and both coastlines can be seen very clearly, while in the centre the individual buoys supporting the boom are well defined.

In all these pictures the large central spot is, of course, the location of the ship carrying the radar.

An illustration of a further point, which is of great importance in the navigational use of radar, is given by fig. 4. This picture was taken in a narrow part of the Thames near Gravesend, and it can be seen that, while the curve of the northern bank can be clearly seen to the north-west and north-east of the ship, the portion of the south bank nearest the ship appears to contain a small bay. This bay does not, in fact, exist, but, due to the closeness of the shore, such powerful echoes were returned that the radar receiver was paralysed and ceased to give any indication at short ranges.

This is a somewhat extreme case of the effect of paralysis due to very strong reflections from near-by objects, and there are several methods whereby it may be minimized or almost entirely eliminated. It is, however, an example of the kind of problem which faces the radar designer when accuracy at very close range is required.

For navigational purposes, it is most desirable that the radar picture should be immediately recognizable as a section of an ordinary chart, and to facilitate such recognition, an

optical device has been developed which permits the radar map and a chart to be superimposed on a screen, as illustrated on the opposite page.

It will already have been realized that radar is subject to certain fundamental limitations which are dictated by the laws of nature.

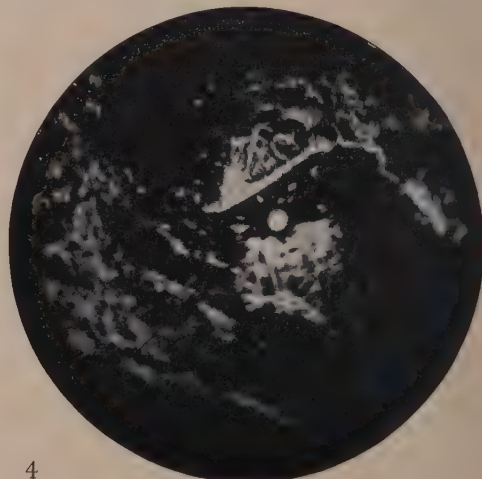
The laws governing the propagation of very short waves in the ether, which limit the maximum range obtainable under given conditions of radar aerial height and target altitude, cannot be altered by the progress of research and must always apply. Similarly, the absorption properties of the various gases in the atmosphere must always preclude the use of wavelengths to which these gases are opaque.

Apart from such fundamental limitations, however, there are many which are purely problems for the research scientists to solve. The need for very short pulse duration, for instance, has already been pointed out, and it is likely that the future will see further improvements in this direction. With the pulse durations currently in use, a minimum range as small as 50 yards has been achieved, but, to a navigator bringing his ship into harbour during thick fog, and more particularly to a pilot landing an aircraft, evidently information about this last 50 yards may well be the most important of all requirements.

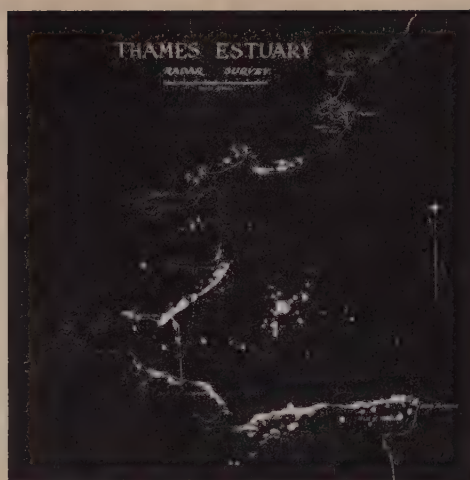
Since the days of the first aircraft-watching stations, enormous advances have been made in the techniques of maintaining every part of a radar system within very close limits of a standard performance, and the cases in which radar fails to provide accurate information are nowadays very rare indeed. Faults, however, can and do occur, and during the war it



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The picture on the right has been constructed by superimposing the radar plan shown on the left onto a navigational chart of the same area. It can be seen that there is perfect agreement between the two maps, excepting only at the comparatively long range of northern Essex. The disagreement even here is not of very serious concern to a ship so far away, but it is quite possible, by adjustment of the radar presentation, to eliminate entirely any such discrepancy with the chart

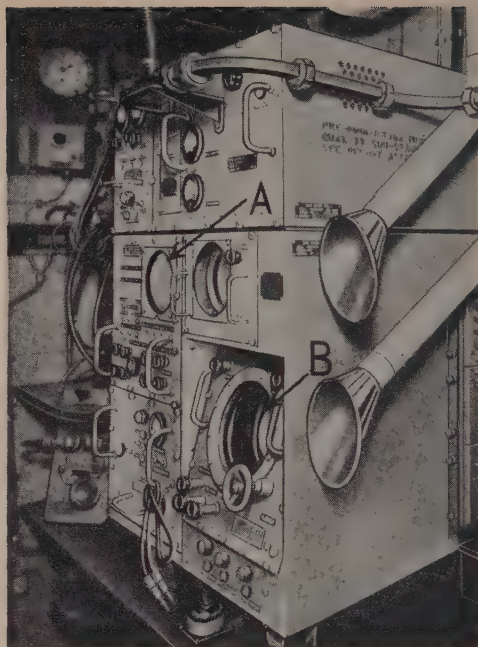
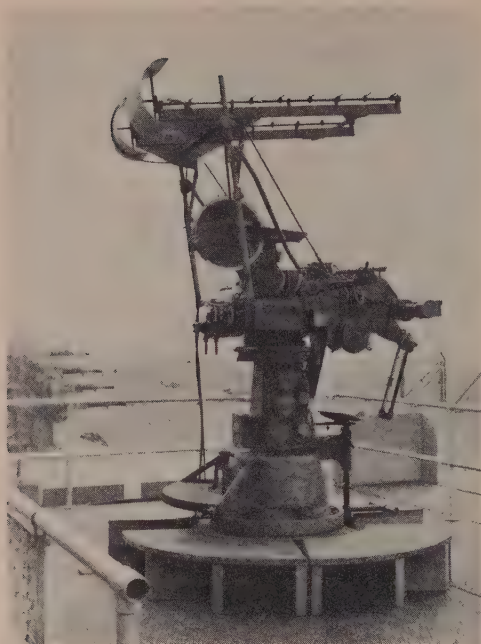
was necessary to provide skilled radio mechanics who could be constantly checking the operation of their equipment, to keep it within tolerable limits of accuracy. Under normal peace-time conditions the provision of such maintenance staff in every ship and at every airport where radar may be employed, would evidently be a very expensive undertaking. Much attention, therefore, has been given to the minimization of the possibility of radar failure, and a system has been developed whereby, without the assistance of any trained personnel, the performance of every part of an equipment is automatically and continuously checked by an additional apparatus which has been named the Performance Meter. This 'meter' is an integral part of the radar system, and is so designed that, should the performance of any part of the equipment, including the 'meter' itself, vary beyond predetermined limits, the observer (most probably a Navigating Officer), is immediately warned by means of a bell or other convenient indicator. Should performance fall below a further predetermined limit of accuracy, the entire installation automatically ceases to operate, and the danger of relying on faulty information is thus eliminated.

This Performance Meter is being incorporated into the radar equipment at present being produced for use in the Mercantile Marine; further, the radar is so designed that, should any particular 'unit' develop a fault, it

may be quickly located and interchanged for a sound one, either carried aboard the ship as a spare, or held in store at all major ports. The faulty unit may then be repaired at leisure by skilled personnel in suitably located 'Service Stations'.

Among the purposes, other than navigation, to which radar may be applied, its use for locating targets during the last war is perhaps the best known. The discovery of the position of the German battleship *Scharnhorst* in the darkness of the Arctic night, and the training of British naval guns onto her without the use of searchlights, is a very good example of the advantage of surprise which can be derived from radar during a naval action. The 'blind' bombing of Germany is another instance, in which the P.P.I. map, instead of being used for navigation, was used to provide an accurate picture of the terrain below our bomber forces, enabling them to place their bombs on target with extreme accuracy.

The use of radar for the location of objects, however, is by no means confined to the practices of war. It has already been mentioned that certain wavelengths are largely reflected by clouds, and that the movements of cloud formations may therefore be examined by radar. This is an invaluable aid to meteorological investigation, and is particularly useful in the science of weather forecasting.



All photographs by courtesy of Admiralty Signal Establishment

(Left) *The purely wartime use of radar: an early Naval set for directing anti-aircraft armament.*
 (Right) *A modern Naval radar installation. This particular set was responsible for the plot of the Thames Estuary shown on the preceding page. It incorporates both a 'straight line' presentation at 'A', and a 'Plan Position Indicator' map at 'B'. This radar set is similar in many ways to the equipment which is being developed for use by the Mercantile Marine*

By methods similar to those used during the war for plotting the movements of enemy aircraft, the progress of various other airborne bodies may be studied by radar. Large flocks of birds, for instance, produce easily recognizable 'echoes', and a series of long-range radar stations might well be used to follow the progress of migrations.

A further and somewhat novel use of radar which has recently received a good deal of publicity, is the ranging of the moon. The difficulties to be overcome before this operation could be successfully achieved were many, for it has already been seen that the atmosphere, particularly the ionized layers in its upper regions, may have a marked absorption effect on radar waves.

The use of radar for investigating these ionized regions of the upper atmosphere can provide information of great value in planning short-wave communications channels and television services, besides having a more abstruse value in the furtherance of our knowledge of the nature of our planet, and indeed of the whole universe.

Again, the fact that various wavelengths are

reflected or absorbed in varying degrees by different types of terrain may well prove of assistance in surveying the surface of the earth, and here there is a possible application to the location of mineral deposits near the surface.

Radar itself is only one of the many uses of very short waves, and allied to it are various other wide fields of application. Very short waves may also be employed, in a similar way to X-rays, for investigating the structure of materials which are partially opaque to their passage, and, in yet another field, the heating produced in substances when subjected to their influence has numerous applications, an example of which is the tempering of steel. Such waves also have many medical applications, both in the diagnosis and in the cure of diseases.

The field of research is so wide that it is impossible to delineate its extent. We may rest assured, however, that the benefits which have so far been derived from ultra-short radio waves are but a small foretaste of the immense advantages that they will bring to mankind in the future.

Impressions of Moscow and Leningrad

by DONALD SEAGER

WHEN I stepped out of the Russian aircraft at Moscow airport on Boxing Day, 1945, my first surprise was that there was so little snow and so many people. It was cold enough, about minus twenty degrees centigrade, but the snow was hardly more than a thin film covering the frozen earth.

The first Russian I shook hands with was General Eugene Fedorov, who commanded the Polar expedition of 1937 and who, with his companions, spent many weary but valuable months drifting slowly southwards on a gradually diminishing ice floe. I took an immediate liking to him, a liking which grew as I came to know him better.

By an interesting coincidence, we found a mural of the expedition on the wall of the great pillared room in which we took our first meal in the Soviet Union, and I learned later from Anatol Fenogenov, the leader of our party, that he himself had been a correspondent at the base from which the expedition set off. When we sat down to supper it was already dark, in fact we had watched the darkness gradually enshroud the wooden houses on the outskirts of the city as we sped along—the red stars of the Kremlin shining in the distance—in the purring Stalin Auto limousines which brought us from the airport. Along the wide, kerbless roads, marked out at intervals with tree branches peeping from the banked snow, we honked our way past old women following sleds laden with wood and drawn by shaggy, compact horses. The people were on their way home from work, and I saw for the first time the single-decker buses and trams, with people hanging on the outside and wedged inside in tight, complacent masses. I was later to travel on these trams and discover how good-humoured and talkative the people are, under travelling conditions which would make the London suburbanite write long letters of complaint to the London Passenger Transport Board.

Jostling, purposeful crowds poured through the palatial entrances to the Metro; the broad streets, sheltered now by stiff, white concrete buildings, were alive with traffic, and the noise of motor-horns punctuated the music seeping down from some unseen source

through the frosty air. A few moments later, behind the double insulated doors of the Hotel Moscow, we were confronted with a vast and strange silence.

When I told the first Englishman I met that we were staying here, he was amazed, for it is apparently very rare for a foreigner to have this privilege. But then we, the first British Youth Delegation to the U.S.S.R., were very lucky and privileged young people; we had come here at the invitation and expense of the Soviet Government. And although this meant a certain amount of organization about our activities, we soon discovered that our hosts, the Soviet Anti-Fascist Youth Committee, could make arrangements for us to see everything we wanted to see. When there were no organized expeditions, we were free to wander about as we wished, and although most of us chose to wait until we could go with an interpreter, of which there were several attached to our party, I often cut off by myself or with a friend.

But here, in the very hotel, were crowds of interesting people, not only the many Soviet celebrities who came to dine with us, but the ordinary men and women who worked here, from Vera, the smiling and wrinkled old chambermaid, with her shawl and felt boots, to the solemn and inscrutable old man who stood by the restaurant door, and very occasionally opened it. One of my first impressions was that everyone seemed to wear medals. Many of them had taken part in the defence of Moscow and many had medals for good work—whatever their trade or occupation. This is but one feature of the huge system of rewards and incentives which are an integral part of Soviet life.

Down in the vast hotel lobby, with its statues of Lenin and Stalin, there were two kiosks, one selling jewelry and the other newspapers and books. I felt very sorry for the old chap at the newspaper stall, for although he was most friendly and obliging, he just could not count. In the end, I used to write down the price of everything on paper, total it up, give him a ten or twenty rouble note and count out my change from



All photographs by the Author

The Bolshoi, most magnificent of Moscow's many theatres, where performances of ballet, opera and Russian and well-known British plays are given by the most talented of Soviet artists. The theatre is also used for great meetings such as that addressed by Stalin on the eve of the elections



The entrance to one of the Metro stations—the impressive façade gives some indication of the architectural beauty of the interior. The round fur caps worn by some of the men in the foreground are the most general headgear, while the cloth cap marks the wearer as a lower-grade manual worker



A street scene in Moscow, near the centre of the city. The snow is energetically removed shortly after each fresh fall. On the left is one of Moscow's many bookshops, containing books in almost every language in the world. A high priority in paper supplies is given to political literature

a pile of money he put on the counter. In most of the shops, and in the business offices, they have counting boards with gleaming black and white bone discs.

Shops in the Soviet Union are very confusing to the uninitiated, and it was some time before the pattern became clear to me. There are two types, the State Shop and the Commercial, or Special Shop. They are all run by the Government, but while at the State Shops it is necessary to produce a ration card for everything purchased and the prices are well within the pocket of the humblest worker, at the Special Shops goods are sold 'off the ration' and at prices ranging from anything between five and twenty times those charged in the State Shops. When I said to one of our Soviet friends: "It is rather like an official Black Market, isn't it?" he replied: "Well, I suppose you could call it that but, of course, as goods become more plentiful, prices in the Special Shops will fall lower and lower—already they have been cut three times this year—until eventually the need for them will disappear. Meanwhile, they do offer some incentive to the worker, who knows 'that he can buy anything except birds' milk in these shops, if he has the money." At both types of shop, special categories of workers are entitled to a discount, which

starts at 15 per cent and goes up as high as 50, and this system, strange as it may appear on superficial examination, certainly appears to work and did, I believe, help to solve one of the Soviet Union's big war-time problems—the tremendous increase in the circulation of money without sufficient luxury goods in the shops to draw off, at normal prices, the surplus. The shops themselves seemed sombre but were well stocked with a wide range of goods. I realized how small price tickets could be made while still being effective, and I was happy to notice the courtesy and charm of the people who served behind the long glass counters.

Out in the streets, too, you find kiosks, and women with trays selling oranges and, of all things, ice-cream. Along Gorki Street you will notice men standing by a small serving-hatch in the side of a building and, with their feet on the snow-covered pavement, drinking light beer from pint-size glasses.

Such novelties seemed as nothing, however, compared with the sight that met me as I stepped out of my hotel bedroom one morning: a man who appeared to be skating up and down the corridor with a wooden block strapped to his bare foot. It was some time before I realized that this was not an indoor sport but a hotel employee polishing the floors.



The main entrance to Moscow University. There are 6800 students and the remarkably high figure of 60 per cent of them have seen service in the fighting forces. Separate quarters in the hostels are provided for married students

All these, however, are trivialities. They are the superficial scenes which, although interesting in themselves, barely cover the deep, solid heart of Moscow. I do not know when I first became aware of the dynamic, relentless force which seems to motivate the Soviet people and which, for want of a better name, we might call spirit or morale. It must have grown upon me gradually as my horizons widened and the day-by-day scenes grew to be familiar, and I found myself trying to probe beneath them; as the faces of people, passive or laughing, began to be more than just new faces and became intensely human barometers of a country's spirit.

Sometimes, as I lay beneath the light blankets of my bed in that warm room which I was to share for nearly two months, and stared across at the vast white building opposite—it was where the statistics of the Soviet Union were collected and sifted—I used to wonder at the fact that always lights were burning. If I awoke during the night

they would still be there, and through the uncurtained double windows I could see the dark shapes of people working, working the night long. And, gradually, the pattern became more definite. I realized that some of the interpreters who were with us did not leave the hotel until the small hours of the morning and yet were back with us for breakfast. One night, just before we left for Leningrad, I went into our host's room well after midnight, and here he was busy on the telephone with the arrangements for our departure. Perhaps it was at this instant that

I began to appreciate the tremendous capacity for sheer hard work which is a characteristic of these people. When I went into the schools I saw this same application to work. In the formal, workmanlike classrooms of the two- and three-storied schools there was a concentration and sense of purpose which made me feel my own school-days must have been remarkably leisurely, and academically inconsequential.

But to describe the U.S.S.R. as a country of all work and no play would be as misleading as my own first impression. I visited many theatres—in Moscow, in Leningrad, Kiev and Riga, and saw also the humble circus, which incorporates our own music-hall type of entertainment, as well as many shows in the Workers' Clubs and the Pioneer Houses. In fact, it was in the theatres that I really saw, for the first time, large numbers of Russian people without the heavy coats and fur caps which seem to swaddle their individuality. In the theatre foyers, taking the

The thirteen-year-old group at their singing lesson in a Girls' Secondary School. Co-educational schools in the Soviet Union are gradually being liquidated. Like most Soviet children, the girls are warmly, if not smartly dressed

arm-in-arm promenade which is a regular feature—the Soviet people always appear to be moving—it seems as if they thaw with the pleasant warmth, and both in their costume and attitude flower into rich colours that were hidden in the frozen streets. It was a great pleasure for me to stand and watch them talking animatedly as they walked, to see the Red Army officers with their rows of bright medals, the women with their evening shoes and bright costumes, a shawl adding here and there an old-fashioned touch of dignity, and to try and picture the remote parts of the Soviet Union from which the men with the narrow, dark eyes of the Orient and the girls with the long silk dresses had come. At the evening theatre you could see a complete cross-section of Soviet Russia and I have had many stimulating conversations, based on remarkably few words, in the theatre lobbies, brief snatches of human relationships which convinced me more deeply than ever of the overwhelming friendliness and almost naïve charm of these people. The children alone were missing, for they are only allowed to go to the special matinée performances, and you never see them in the evenings.

The Soviet Union seemed to have two different cultures. There is the culture of the ballet and the opera which has, whatever the origin of the piece, a grand and gracious quality which is peculiarly Russian. And, again, there is the pseudo-culture, the harsh, strident importations of music and the jitterbug from Western civilization which the broad Soviet hand wears like a lady's cheap glove.



I sat enthralled at the dancing of Olga Lepeshinskaya in *Don Quixote*, and, as she moved across the vast stage with a vitality which seemed to make her slender body almost without substance, and yet vibrant with the beauty of life and youth, I felt, for one moment, the collective appreciation of art and beauty which pressed as a subtle breeze of sympathy from the audience, and returned in pulsing currents to the very being of the simple people who sat there with me. The Soviet people have a great affection for everything Spanish, from what origin I never discovered, unless it is the feeling of a newly emancipated peasant people for the peons of Spain, and a common love of the dance. But it was in the soft, ethereal quality of the *Swan Lake* or of *Giselle* that Russian ballet seemed most expressive and natural, and I thought sometimes I could hear, above the soft music, the joyful laughter of Russian children as they skated over the frozen Moscow river or crossed, with their characteristic beauty of



A part of the Pravda Children's Home, on the outskirts of Moscow. The Home consists of a series of wooden buildings and includes a school, hospital, library and workshops. There are 410 boys and girls at the home, most of whom are war orphans. They all receive a seven-year education

movement, the broad streets of the capital.

The regard in which the Soviet people hold their culture was, perhaps, most clearly brought home to me when I listened, between acts of *Ivan Susanin* at the lemon-and-blue-tiered Bolshoi Theatre at Leningrad, to the Director of the theatre. He told us of the damage suffered during the siege, how the company had returned from evacuation to find nearly the whole front of the theatre out and the massive dome moved bodily four feet by bomb blast, and how, despite this, they had reopened a bare eight months after the Germans had been driven away.

Leningrad is, indeed, a city of colour. Freshly painted green, pink and yellow buildings tinged the snow with soft radiated hues, and already the bright red of new bricks showed where fresh façades had been built. We reached it early one morning in January, after an all-night journey in the 'Red Arrow' express. This, and the return, were the only trips we made by train, for our other venturings from the capital were in the austerity Dakota which was to put us down on the airfields of Kiev, Stalino and Stalingrad, and the tiny, sea-fringed landing strip at Sochi, on the Black Sea coast.

After one of the inevitable rushes which I began to associate with the beginning of any journey in the Soviet Union, we were hustled past people sitting on great bundles of luggage, into the train. It started fifteen

minutes late. With the long chimneys poking from the carriage roofs, and the crackling wood fires under the gleaming samovars at the end of each corridor, it seemed rather like a house on wheels. But what service! The attendant emptied the ash-trays almost before they were dirty and brought us tea in the long glasses set in silver holders. We had taken our own food because there was no dining-car. I took a walk down the train, a perilous undertaking this, since moving from one carriage to another involves groping in the darkness across the moving metal plates, coated with ice, which join them, and there were only short iron rails to which you could cling. I passed two serious-looking civilians playing chess in the corridor, sitting on the tip-up seats which seemed to me a good feature in these days of crowded travelling.

The Russians, for a reason which I could never quite appreciate, were extremely sensitive about their travelling conditions. It seemed to me that, after the tremendous struggle from which they had just emerged, they would accept bad transport as a natural outcome of the material losses they had suffered, and point to it with the same sad pride with which they showed us their broken cities. Such was not the case, and one of the stormiest interviews I had during my stay concerned a badly written but materially accurate article on transport which I wished to send home. Anatol, our host



Three members of the British Youth Delegation with the horse-drawn sled in which they completed the last stage of their journey to the Home. The child on the left is one of the Home's youngest members. There are more than a hundred such Homes in the Moscow region, though few are so large

and editor of *Red Sport*, pointed out to me that the journey from Moscow to Leningrad now took several hours longer than in peace-time owing to the heavy damage to the lines during the war. I was quick to appreciate this, but the interview was revealing not so much by the reasons I was given for crowded trams and trains, as by the indication it afforded of the intense pride with which the Soviet people regard their own achievements and their loyal, if at times biased justification of those conditions in the U.S.S.R. which do not yet approach Western standards. The Metro in Moscow is, of course, architecturally beautiful and a wonderful technical achievement but, at certain times during the day, it becomes intolerably overcrowded and a real physical struggle is involved in getting in and out. Two of our party lost gloves in one of these good-natured scrums.

While we were being driven through Leningrad, we noticed many beautiful churches. All were in good repair but many, our guide told us, were no longer in use. This preservation of Russia's historical buildings and treasures is absolute. At Klin, a two-hour drive from Moscow, we visited the house of Tschaikovsky, and here the Soviet Government have employed the composer's nephew, now a very old man, as curator. The priceless treasures of the Tsars are kept in the Kremlin, and we were able to see the past glories of those spectacular days, swords

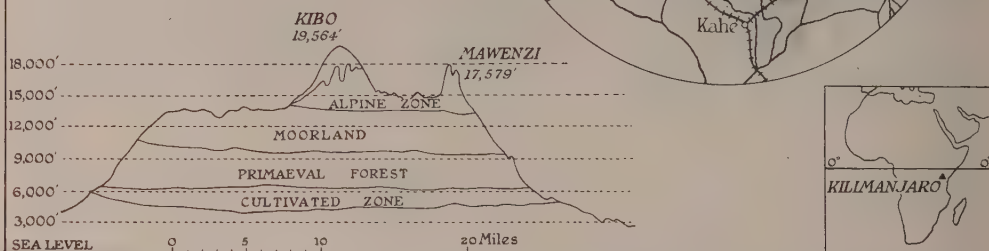
and helmets, jewelled saddle-cloths and gilded carriages complete with model horses.

Thus one finds the old preserved in the midst of the new. But it is the new, the tremendous almost elemental vitality of the Soviet people which makes the strongest impression. They have learned, and are still learning, much of the art of living and working together. In Leningrad the streets were full of people, of all ages and descriptions, chipping away the hard snow with long iron bars—a truly co-operative effort, but not without its humorous consequences. A particularly energetic team had cleared a complete section of one of the bridges, and at this gap an old man with a heavy, horse-drawn sled arrived. The horse stopped, the man stood and scratched his head; he was still regarding the clear patch of road with a bewildered and faintly hostile stare when we moved on.

These are grim days still in the U.S.S.R. The memory of the war is as close as the broken buildings which surround Leningrad and Moscow; but, like the patchwork façades which poultice the damage and the new buildings which are rising with an increasing tempo, the hearts and memories of the Soviet people are slowly healing and new, bright hopes are lifting the vista of the defenders of Russia's two greatest cities beyond their scarred homes to a future in which they believe as firmly as in their own strength to achieve it.

Kilimanjaro

by KATHLEEN FIRMIN



Stanford, London

THE discovery of snow-covered mountains in East Africa in the middle of the last century—Mt Kilimanjaro, Mt Kenya and the Ruwenzori Range—led to attempts to identify the “Mountains of the Moon” which were described by Ptolemy as being south of the equator in Central Africa (see page 71 of the June number of this Magazine). Although the Ruwenzori Range is known today as the “Mountains of the Moon”, it is unlikely that Ptolemy had knowledge of this range set in the heart of Africa, but possible that he referred to Mt Kenya or Mt Kilimanjaro which are nearer to the East African coast.

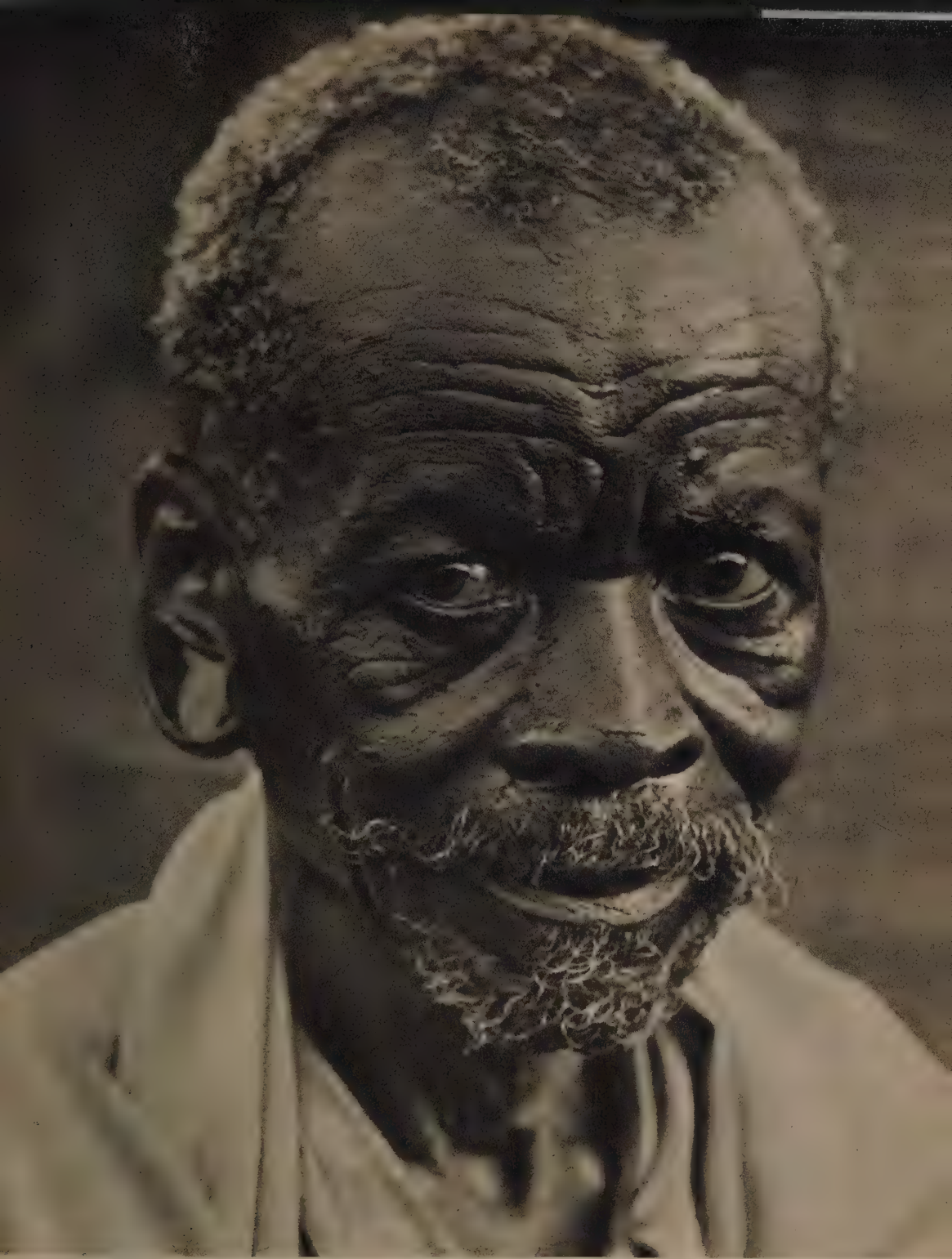
Kilimanjaro lies rather more than three degrees south of the equator. Rising abruptly from the vast plains of equatorial Africa, the snow-capped dome of the highest peak, Kibo (19,564 ft.), can be seen over a hundred miles away. In 1848 Rebmann, the German missionary, first saw “what looked like a beautiful white cloud” covering the summit of Kilimanjaro, and on being told by his guide that it was *beredi* (cold), he realized that he was the first European to see one of the mythical ‘silver’ mountains of Africa. A year later his colleague Dr Krapf also saw the snows of Kilimanjaro, but a leading geographer of those days ridiculed these reports and tried to prove that it would be impossible for snow to lie on mountains exposed to the fierce

tropical sun. In 1871 this discovery was established without a doubt by Charles New, the English missionary, who reached the snow-line on Kilimanjaro.

Several attempts were made by some of the early explorers of Africa to blaze a route to the summit. At last, in 1889, Dr Hans Meyer and his companion reached the highest point on Kilimanjaro and were the first to gaze inside the wonderful crater of Kibo.

Kilimanjaro is the highest mountain in Africa. It is a huge volcanic mass culminating in two peaks, Kibo (19,564 ft.) and Mawenzi (17,579 ft.). At 15,000 feet the peaks are joined by a long plateau or saddle, the distance between the peaks being six or seven miles. Mawenzi is a jagged rocky mass, the remains of an old crater. Kibo, the youngest part of the mountain, is a beautifully shaped volcano. Its elliptical crater is over two miles in diameter packed with snow and ice.

There are no very great mountaineering difficulties to be overcome when climbing Kibo, although mountain sickness has defeated many attempts to reach the summit. Mawenzi on the other hand can be climbed only by experienced rock climbers and the rock is rotten and often dangerous. The journey to the top of Kibo and back should take about five days from Marangu on the slopes of the mountain, if the party is acclimatized to high



An 'old man of the mountain' : one of the Wachagga who live at the foot of Kilimanjaro



Mawenzi from Kibo, seen across the six-mile, ash-covered saddle that separates the two peaks of Kilimanjaro at about 15,000 feet



Below the saddle and above the forest lies a belt of open moorland, springy with grass and heather. Mawenzi towers in the background



Kibo from the foot of Mawenzi. The hidden beauties of the crater are guarded at over 19,000 feet by an almost unbroken rim of ice



The first view, from Johannes Notch, into the crater: a landscape of lunar cold though the Equator is barely two hundred miles away



The crater of Kibo is piled high with fantastic masses of ice. An ice-cave—



—and 'The Cathedral', rising in forms of surpassing beauty from the crater bed



All photographs by A. H. Firmin, A.R.P.S.

Mawenzi at daybreak.

altitudes, but will take longer if mountain sickness develops. As with all great mountains, the difficulties which faced the first explorers of Kilimanjaro have to some extent been overcome. The route is now well defined and three huts have been erected: Bismarck in the upper reaches of the great forest, Peter's Hut on the open moorland belt and a third at nearly 16,000 feet on the slopes of Kibo.

At the foot of the mountain lies the country of the Wachagga. From Marangu Guest House it takes only an hour or so to reach the edge of the primeval forest which starts at 6000 feet. Here we pause to gaze over the green banana groves of the Wachagga, our last glimpse of human habitation for several days. Then we plunge into the gloomy forest which is more often than not enveloped in mist, rain and low-lying clouds. High up moss festoons the trees and thick moss carpets the ground. Amongst these ghostly, weird-looking trees the night is spent at Bismarck Hut where the porters soon kindle a cheerful fire.

A short walk the next morning takes us out onto the open moorland above the forest belt. On a clear day there are wonderful views of the peaks and the plains below. The ground is springy with moorland grass and heather. It might be a wild English moorland except for the giant *Senecio* often ten or fifteen feet high and the pink and white everlasting flowers growing in profusion. Peter's Hut is above the clouds which cling closely round the forest regions. In the early morning a hoar frost covers the ground. As we approach the saddle, we come near to the slopes of Mawenzi, whose rocky pinnacles tower above us. The moorland becomes more sparse and finally disappears altogether. Now begins a wearisome trek across the soft volcanic ash which covers the saddle and continues in a gradual sweep up to the glaciers on Kibo. Movements become slow and laboured owing to the altitude and the caravan of porters looks like part of a slow-motion film as it doggedly treks along. A bitter wind blows across the saddle: our feet seem weighted with lead.

When my husband and I ascended the mountain in 1941, we were fortunate in escaping mountain sickness which so often attacks climbers when they reach the saddle, and, although tired, we enjoyed a hearty meal at Kibo Hut. We retired early and Sambananga, our guide, called us at 2.30 next morning, as it takes anything from four to six hours to toil up the volcanic ash to the edge of the crater. In this last day's ascent breathing is laboured, and although at first it is possible to walk a hundred yards

and then pause for breath, the pauses become much more frequent as the angle of the scree becomes steeper. It was a trying and monotonous climb but the hidden beauties of Kibo urged us on to fresh efforts. At dawn we were well up the scree. Across the long saddle Mawenzi rose above the clouds which were piled layer upon layer round the lower slopes of the mountain—a jagged form silhouetted against the glow in the eastern sky. Gradually the clouds turned pink and suddenly they were pierced by the flaming rim of the sun.

When Hans Meyer made his first ascent of Kibo he cut steps up the Ratzel glacier, as he had no knowledge of the notch on the crater's edge where there is a break in the solid ice-cap of Kibo. Nowadays climbers make for this notch and at last scramble up some loose rocks to gaze into the crater. On both sides are great masses of ice covering the rim, forming glaciers which on the western side of the mountain descend to 14,000 feet. The wall of the crater is in places 600 feet deep. Part of the ash covering the crater bed is visible but elsewhere it is piled high with fantastic masses of ice.

Kaiser-Wilhelm Spitze, the true summit of Kibo, is west of Johannes Notch where we first looked into the crater. The journey to the summit and back takes two or three hours from Gilman's Point, which is the first of a series of rocky projections along the crater's edge. The route lies along the crest of the glaciers and although there is no more stiff climbing, negotiating the glaciers at this height is very tiring. If the climber wishes to reach the highest point of Kibo in one day from the hut, there is no time left for exploration of the crater. He must either spend the night camping at over 19,000 feet or make a second ascent of Kibo.

In 1942 my husband again climbed Kibo on the southern side to Johannes Notch in order to make a photographic record of the crater. He descended the crater wall and made his way to the northern side where lies the 'ash-pit', the centre of eruption. He was able to take panoramic views of the whole of the crater wall and also the inner crater. One of his photographs taken inside the crater we called "The Cathedral", as no other words seemed to us to describe the beauty and form of this mass of ice. When he reached the ash-pit he was nearly overcome by sulphur fumes and saw steam escaping from fumaroles in the side. When this was reported in Moshi, it caused much interest and speculation as to whether Kibo is again showing the first signs of activity.



Kallfa, Tirana

The New Albania

*The Dajti mountain near
Tirana, capital of Albania*

by LOVETT F. EDWARDS

The following article was written in December 1945, but conditions in Albania have not changed materially enough since then to diminish its value as a description of the background against which events, not only in Albania but over a great part of the Balkans, are to be viewed

POST-WAR Europe is still filled with hatreds and suspicions, but behind all these lies a desire for better conditions and for a system of government in which the people, in the widest sense of the word, are to play a part. At the moment there are two principal theories whereby this result is to be attained—the Anglo-American and the Soviet. They have not inaptly been named political democracy and economic democracy. Each pays lip-service to the ideals of the other. They are not incompatible but twenty years of embittered propaganda before the war have made them appear so.

Between the geographical limits of these two conceptions of a new world order lie the Balkan countries, which have accepted the ideals inherent in both these systems. They are now trying to work out a democracy of their own, not modelled slavishly either on

Anglo-Saxon or on Soviet forms, but containing many features common to both and adapted to the needs of peoples who, though brave, intelligent and hard-working, are still politically immature and to a considerable extent illiterate. Their governments are in the hands of men who have personally fought for the liberty they are now trying to mould into a political shape, men of goodwill and driving power, though often of little experience. Of this vast experiment, what is to be born?

Amongst the Balkan peoples who have fought bravely and successfully for their national liberty, perhaps the least known and the most interesting are the Albanians. For Albania has, so to speak, changed overnight from a picturesque country of rich landlords, backward peasantry and feudal customs, to a political entity of quite another type. In

fact, the Albanians are trying to create in a few months or years a new state of society.

The result is bound to be interesting.

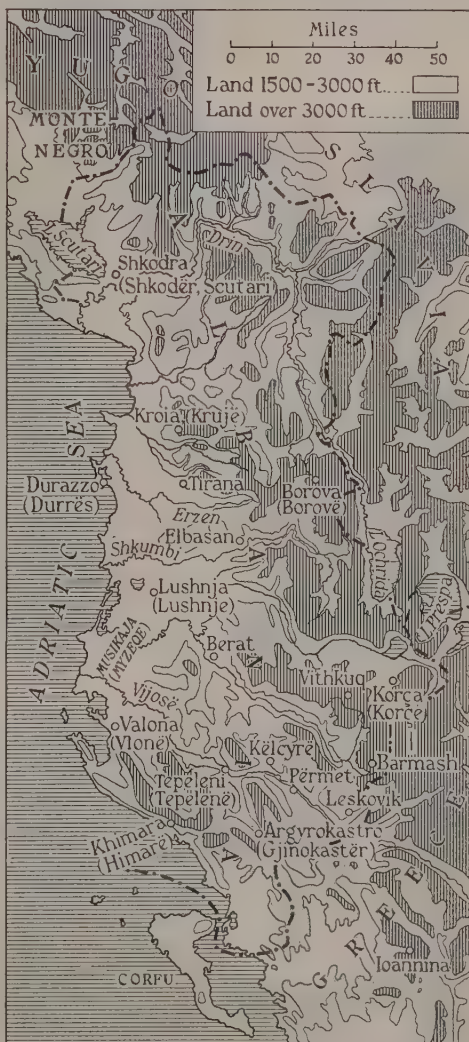
To understand it, one must know something of the most recent history of Albania. This history is very little known to us, but I may assume that its main outlines are sufficiently familiar up to the Italian invasion of 1939, the flight of King Zog and the consequent attempts of the Italians to bend the Albanian people to the Fascist system of government. Thenceforward the story is obscure. The world canvas was too overcharged for any save a few experts to interest themselves in what was happening in this mountainous and distant corner of the Balkans.

In July and August 1943 German troops began to arrive in Albania. Formerly they had only passed to and fro on their way between Greece and Yugoslavia, where the Partisan armies were already in operation. Neubacher, the stormy petrel of South-East Europe, arrived in Tirana to take over control in the name of the Führer, first by underground methods and later, after the Italian armistice of September 1943, more or less openly. On September 9 the German army, forestalling any effective action by the Italian 9th Army then in occupation, took practical control of the country.

Technically Albania was in a curious position. As a part of the Italian Empire, the puppet government then in control had declared war on the Allies and, later, was not specifically included in the September armistice. From the German point of view, Albania might have been regarded as a friendly and Allied state. At any rate, the Germans were content with a *de facto* occupation and set up an Albanian National Committee which, in the words of the official German news bureau, "was to assume responsibility for the Albanian nation on the basis of independence of the Albanian state". One of the first acts of this Committee was to revoke the decision of 1939 by which Albania was included in the Italian Empire and the throne offered to the House of Savoy, and also all decrees and laws passed since that date which were considered to endanger the interests of the state. These included the decree of June 1940 whereby Albania had declared war on the Allies. Thus Albania, from a strictly legal point of view, became a neutral and independent state. To those unable to see the hollowness of these pretensions the Germans could, and did, pose as the liberators of the Albanians and succeeded in inveigling many Albanians of good reputation to join them. It seemed that the

Germans had pulled the chestnuts out of the fire and created another satellite state of the New Order in Europe.

But there was another side to the story. Ever since the Italian occupation there had been Albanian Resistance movements of one kind or another, some of them mere sporadic bandit outbreaks, some of them sufficiently organized and protracted to be considered serious opponents of the local Fascist régime. It was a time of obscure struggle, out of which the leading parties and figures of the war of national liberation were to be born. From 1941 onwards the Yugoslav National Resistance, also at first fractional, then defined into



Stanford, London



Albania's capital, Tirana, has a normal population of only 30,000; but its modern quarter compares favourably with other Balkan capitals. This it owes to the Italians, and most of their well-constructed buildings have survived the hard fighting that took place when the Germans were driven out in November 1944. Many of the smaller, older houses are, however, in ruins.

- 1. A bridge near Tirana wrecked by the Germans in their retreat*
- 2. An Albanian sniper in the battle of Tirana, November 1944*
- 3. Members of the Youth Labour Brigade cleaning up war damage*



Radio Tirana

the two main groups of General Mihailovich and Marshal Tito, and finally concentrated in the latter, had commenced. With this movement the various Albanian groups had close connections and their development followed a somewhat similar course. By the time the real struggle against the Germans commenced, towards the end of 1943, the minor groups had ceased to be of any real political importance and of the two major Resistance movements, the Balli Kombëtar or Patriotic Front and the National Liberation Movement under Enver Hoxha, the former had gradually retired from any active resistance and finally joined the Germans openly in their attempts to crush Enver Hoxha's Partisans. The Legality Party of Abas Kupa, which tried to keep alive a sense of loyalty to King Zog and had few adherents except among members of the Mati tribe, of which Zog and Kupa are both members, took little part in the struggle and finally disintegrated.

As in Yugoslavia, the Partisan movement was originally created and organized by the Communist party, but it cannot be too often pointed out that the Balkan Communists were, and are, also ardent patriots with a clear-cut scheme



Soon after the last German had been driven from the capital, the Provisional Government held a parade of all those elements of the nation which had contributed to the success of their Resistance. The Partisan army took pride of place, saluting war-widows on the reviewing stand. Festivities brought out treasured heirlooms in the shape of national costume.

4. The National Liberation Army marches past: note woman soldier

5. A group in national costume, with richly ornamented jackets

6. Mothers and relatives of fallen Partisans join in the procession



not only of Partisan warfare but also of eventual social and political reform which they are now putting into practice. This programme, if carefully considered with a view to local conditions, would win the support of any fairminded Englishman, and if their methods have sometimes been a trifle violent, it cannot be expected of a Balkan people that they will deal temperately with persons whom they consider less as political enemies than as collaborators with the enemy and therefore traitors both to their party and to their country. In fact, both in Yugoslavia and Albania, the Partisan movement has rallied to its cause many of the finest elements, irrespective of their party.

Amongst other powerful forces operating for the Partisan movement was the Bektashi Moslem sect, a sort of protestant Islam, which has very great influence in Albania.

Without going too deeply into the events of the War of National Liberation, I will attempt to outline its main course. During 1943 the Germans took the offensive and drove the Partisans away from the coastal ports and into the mountains, where they remained for some time, replenishing their numbers and





Kalifa, Tivana



Kallfa, Tirana

A few miles from Tirana is the village of Petrella, where the author was interned by the Italians in 1941. The castle of Petrella, dating from 1443, was a stronghold of Skanderbeg (1405-68), Albania's national hero. Baptized George Castriota, he was renamed Skanderbeg (Alexander Bey) at the Turkish court and became a general. In 1443 he led an Albanian revolt and for 25 years kept powerful Turkish forces at bay. (Opposite) The valley of the Erzen seen from Petrella castle

their morale. By the summer of 1944, their numbers had so increased that they were able to attack German strong points with the aid of Allied aviation. By the end of the year it was clear that the Germans were trying to get out of the Balkans and the Partisan troops were able to take the offensive, harry their lines of communication and destroy their transport and sometimes even their heavy armour. Even now one still finds masses of twisted iron and steel along the Albanian roads that were once the tanks and lorries of the Wehrmacht. Later, they even attacked the Germans in the principal towns and forced them to retreat before they had intended, often with heavy loss. These battles, carried out with comparatively small forces on the Partisan side, were frequently very fierce. The fighting for the capital, Tirana, lasted nineteen days, and one can still see the toll taken in devastated houses, mosques and public buildings. By the end of November 1944, Shkodra (Scutari), the most northerly

city of Albania, was liberated and there were no more Germans on Albanian soil. The retreating columns were flying to the north, still harried by the Albanians, into the haunts of the stronger and better-organized Partisan battalions of Marshal Tito.

That is a very bald account of the struggle carried out by a small people for its liberty and independence, and it is the men who organized and carried out that struggle who rule Albania today. They are fighters and generally look it; and they are not always tender to those whom they consider their enemies. But they are at least manly in their treatment of their prisoners and there is little or none of that revolting cruelty which has stained the reputation during this war of many peoples whom we are wont to consider far more civilized. In the summer of 1941 I was myself captured in Montenegro by the Italians and confined for some months in the political prison at Tirana. This winter I again visited the place of my imprisonment

and, though any prison looks about the same, I found the present occupants less crowded, cleaner and treated far more humanely than were myself and my companions, several of whom now hold high positions in the Albanian state.

Another point cannot be too strongly emphasized when speaking of the Partisan struggle in the Balkans: however fanatic and well organized, no Partisan army could have resisted the long campaigns, especially in the bitter Balkan winter, without the active help of the mass of the people, the peasants. In the long hours when the Partisans were resting in the peasant houses, waiting for the German columns, they not only prepared their order of battle, but also discussed their political ideals with the peasants who fed and supported them. That is the strength of the new Albania. The peasants supported the fighters, most of whom were themselves peasants. They got to know and to approve the Partisan programme of Enver Hoxha, and today the peasants, more than 90 per cent of the population, support the Partisan reforms.

As long as this spiritual bond lasts, the Partisan movement will be strong in the Balkans. If it is weakened by political experiment, then almost anything may happen. At present, save for a certain amount of inevitable post-war reaction, the bond is still strong.

I was talking with the director of the national finances of Albania and he said that the thing that struck him most in this new Albania that has arisen, was the altered bearing of the peasants who came to pay their taxes. In former days the peasant was more or less a serf in the districts where the rich begs held their lands—a good part of the country. He was servile, suspicious and obviously hostile. Today he walks as a free man, the owner of his land, and conscious that he is a participant in his own state. Incidentally, he pays far less taxes. In old days the condition of the tenant farmers was feudal in the worst sense of the word. The peasant farmed the land and kept the flocks and herds. For the mere fact of ownership, the landlord took from him a third of his field produce and what he pleased of his animals. Further, the peasant had to provide free transport for the beg when and where required. There were also other charges. To find a parallel to such conditions in English history one must go back to the days of Stephen or John.

For the real basis of the Partisan states is the agrarian reform, which is in fact no more than the age-old cry of all peasant social

reformers: "The land to him who works it". But in Albania it is a new cry and has created a new class of peasant farmers who are the ardent supporters of the New Order. At Lushnja, for example, I have seen peasants come to the central committee office of the Albanian National Front to ask: "When shall I be able to vote? I want to thank the government for the land that it has given me." Whatever may be said of the parades and processions in the capital, this sort of thing is not faked, and it is this, rather than the shouting and the reiterated inscriptions, that makes the strength of the movement.

So far the reform has been applied mainly in the rich lands of the Musikaja and Korça plains, where it is a comparatively easy matter to allot the farming lands. It will be more difficult in the mountains where fields are small and the land infertile, as critics have quite rightly pointed out. But I can hardly think that the government will try to scamp a reform so essential both to the people and to themselves, and if a certain exchange of population from the arid mountains to the rich plains is involved it will probably not be a bad thing.

At the time of writing I have just come back from a longish tour of southern Albania. This part of the country I had not known before the war, but had heard much of it from the enthusiastic reports of many friends. They would be sorely grieved to see it now. In the larger towns—Korça, Argyrokastrò, Elbasan, Tirana—only a certain number of damaged buildings tell of the passage of war, though nearly a quarter of picturesque Berat has been burnt. But visit the smaller towns, once so beautiful. Kelcyre is a cluster of makeshift huts and a dirty market-place above a ruined bridge; Permet is so battered that it is doubtful if it will be possible to rebuild it on the same site and it is hard to tell the houses from the roughly cobbled winding streets; in Leskovik, once a popular health resort famous for its wines, only four houses remain habitable. The lovely villages along the road to Korça—Barmash, Borova, Vithkuq and many others—are now merely formless heaps of stone. But there is little use making a disquisition on modern ruins now; most of us have seen far too many of them. The point here is that for miles and miles there is nothing else.

In mitigation of this desolate story, it is pleasant to know that the relief programme of the United Nations is becoming very effective. Although work only commenced in August this year, much has already been done, and the warehouses of Durazzo (Dur-



Kallfa, Tirana

Albania has no railways, no navigable rivers, and the road shown above is no worse than many. Despite these very poor communications, UNRRA distributed over 600,000 tons of supplies, which included 50,000 tons of foodstuffs, in the nine months since relief operations began in Albania in August 1945, providing 520 vehicles for their conveyance. (Below) UNRRA flour being landed at Durazzo



Ristani, Tirana



Radio Tirana

Many thousands of young people helped the Partisan army during the years of resistance. The Youth Movement even had its own 'underground' newspaper, regularly published despite enemy occupation. This boy is speaking at a Youth Congress

res) and Valona (Vlone) are full of goods, food, medical requirements and clothes. Here, however, as throughout the Balkans, the real trouble is, and for some time will be, that of transport. Albania has no railways and no navigable rivers; therefore all goods must be transported by road, and however much there may be in the port warehouses, this is of little good to the mountain villages until some means of transport is available. Shipping difficulties—the Germans destroyed the port installations—held this up for some little time. But on the day I left Tirana, UNRRA officials had arranged for the delivery of lorries through the Yugoslav port of Gruž and a first large convoy arrived at Tirana. It was in itself an impressive sight. But it became more impressive when one recalled that food distribution by lorry in these southern areas of devastation is a race against death. For the upland villages, when once snowbound, are cut off from the world for months at a time and without an adequate supply of food, the people living in them are almost certainly condemned to death by slow starvation.

Agriculture, the staple of the Albanian people, has suffered very severely during the war. Not only have farms and villages been destroyed and the flocks and herds reduced to a fraction of their pre-war strength, but the fields themselves have been left untilled for many years and agricultural production has consequently dropped. One of the effects of the agrarian reform has been a threefold increase in the area sown in 1945, but it will be some time before this advance is evident in production. In the agricultural field, the work of UNRRA has been of inestimable value. It has imported quantities of seed wheat and also forage crop seeds, fertilizers and machinery. A number of tractors have been imported and the Albanians taught how to use them. At first suspicious, the peasants have now begun to realize their value. UNRRA, however, is trying to introduce even more far-reaching improvements in agricultural production. It is not its job to regenerate Albanian agriculture, but it is its job to see that the masses get enough food, and an extensive scheme of irrigation will do much to help this. In some fields near Shkodra, production would increase from four to forty quintals of wheat with more adequate irrigation. UNRRA is also importing up to 5000 head of cattle, a number of selected animals for breeding and about two million vines to help in the recovery of the wine trade.

Those who criticize UNRRA's operations

in the more accessible parts of Europe may have good reasons; but the aid it gives is a necessity to these out-of-the-way Balkan lands and no considerations of policy or personal pique should be allowed to check the valuable work that it is doing.

What, you may ask, remains of Albania as a land? Is it still the old picturesque, mediaeval land that has so often been described? It is not. No one can change, of course, the shapes of the mountains and the river gorges. The natural beauty and grandeur of the land cannot be diminished. But the human genius for destruction has certainly done its best to remove all the handiwork of man. And the new Albania that will be, and is being, rebuilt will not be the same as the old.

Besides the material destruction there have been other changes that the tourist may regret—since he only looks at the country and does not have to live in it—but which the people themselves have accepted. We may regret the picturesque crowd of gaily dressed semi-savages who lent such colour to the landscape. But no one of goodwill can regret anything else.

Probably for the first time townspeople and peasants have become inextricably intermingled. Survivors from the devastated villages have found shelter in the larger towns. In the Partisan battles the townsmen have fought beside, or been commanded by, peasants. On the other hand the peasants have seen the townsmen doing work for which they know they themselves have neither the education nor the experience. The tendency towards a false sophistication which the Italians had begun to import into Tirana society—the Albanians describe them as masters in corruption—has been ruthlessly checked and few traces remain. Thanks to these same Italians, who are excellent builders, the modern quarter of Tirana is probably the most comfortable and luxurious of all Balkan capitals, though still on a small scale. But the citizens of Tirana have not thereby become separated from the mass of the people whom they must organize and control.

There are two other results of the war which are of first-rate importance in the development of the Albanian people—the emancipation of women and the struggle against illiteracy. Before the war, the Albanian woman, save for a few beautiful and well-educated leaders in Tirana and perhaps Korça, was a byword. A proverb of the Dalmatian coast put the situation very well: "There are three things that get no rest; a Dalmatian donkey, a Catholic church-bell and an Albanian wife". In the Partisan



Radio Tirana

The low status of Albanian women was for long proverbial: it was part of the general backwardness in a country where nearly three-quarters of the people are Moslems. Their activity as Partisans has earned them political emancipation



Enver Hoxha, ex-schoolmaster and leader of the 'Democratic Front', addresses his followers, who comprise the only recognized party in Albania today. It has grown from the Partisan movement which, sporadically at first but from 1942 with growing coherence, harassed the Italians and, later, the Germans. The peasantry—nine-tenths of the population—strongly supports it

struggle women took a leading part. Many actually fought in the ranks or even became officers. They did well. As an Albanian officer put it to me: "Some of them did extraordinary deeds of bravery and we too fought better and harder. We could not let it be seen that a woman was a better soldier than we were." Others nursed, did necessary secretarial or propaganda work behind the lines. Many suffered for their actions. In the market-place of Argyrokastrë two young girl Partisans were hanged in sight of the people by men of the Balli Kombëtar only just over a year ago. It is true that the pre-war Albanian worked his women hard and regarded them as of far lesser importance than his sons or brothers. But he honoured them within the home and this action horrified and disgusted him. Telling me the story, a simple peasant said bitterly: "This sort of thing has never happened amongst us before."

Well, they probably did not die in vain. For now the Albanian woman has equal rights in the state and in the administration. It may be some time before old prejudice entirely dies—one old peasant told me he would never allow his wife to vote: "It is the first step towards infidelity"—but it is dying. Amongst many others, one of the poet-

composers of the Partisan movement is a woman working at the Tirana Radio station.

Illiteracy is still a problem. But the Partisans claim that it has been reduced by 20 per cent, and it is certainly true that this people has now a lust for learning. I visited many schools and was impressed by the eagerness and diligence of the pupils, both young and old. Also the army has done much. It is rare today to find a soldier who cannot read. It may be a slow and tortoise-like proceeding but he understands in the end. When I visited the criminal prison in Tirana I found an illiterates' class with eager pupils hoping for better things on their release.

Another thing is worth bearing in mind. Now that the war is over, most Englishmen want to get out of the army and forget the war as soon as possible. Therefore we look with considerable misgiving on the continual parades of the states of South-East Europe and the martial fervour of their songs and emblems. But it must be remembered that these people look on their armies with different eyes. To them they are the visible sign of their liberation and a source of pride and, in a lesser way, of education for the young men. There is a bad side to all this—for one thing it is a little too reminiscent of the early

days of Fascism. But on the other side there is a genuine love and admiration for the soldiers who freed the country and the taint of professionalism is not yet.

The national revolution was largely the work of the men of the south. Enver Hoxha, Myslim Peza, Kochi Xoxe and the other leaders and generals are all southerners. So are almost all the members of the government. Naturally, therefore, the men of the hills in the north have taken less kindly to the new reforms. For one thing the reconquest of these areas was accomplished far more quickly and there was less time for the Partisans to explain their actions. Tribal custom and costume was much more firmly established here, and the rule of the local bayraktars was more local and personal and less oppressive than that of the begs and aghas in the centre and south. Also the northern tribes are Catholic and the priesthood was suspicious and hostile to the flavour of Communism in the Partisan movement. They are loyal to the old ideals which had much of greatness and nobility in them, to the ancient Kanun of Lek Dukagjini with its strict rules of hospitality and blood vengeance. Also their minds move slowly. But they too are gradually realizing the value to themselves of the new reforms.

For the south has always been the more progressive part of the country. Here, for

the most part, the people are Orthodox and there is a strong flavour of Greek culture and, indeed, a considerable Greek minority. But as we know from our own history after the Norman Conquest, a foreign cultural infusion may often intensify and stimulate a national movement. Greece has been a foster-mother, but she is not *Shqiptar*, not a Son of the Eagle.

What most intrudes itself upon the observer of Albania now is the contrast with the past. Probably, after some years, the essential resemblances of old and new and the sense of continuity between past and present will become more apparent. But that time is not now. Those who only knew Albania before the war will be today the worst guides to her development. For the new spirit that is abroad in Central and South-Eastern Europe is stirring very deeply in the hearts of the Albanian people. I will be no prophet. Perhaps when the Partisan generation grows older there may be a slowing-up of the process, of the current of reform; there may even be, though that is less likely, a certain amount of reaction towards old ideas and old customs. But it is sure that what has been gained will not be lost; and for those who love and respect the Albanian people and who do not look upon the land merely as a conglomeration of picturesque feudal castles, customs and ceremonies, that is a great thing.



The Albania of Edward Lear

by HENRY HEATHORN

It is just a hundred years since Edward Lear, with his Book of Nonsense, inaugurated what has come to be regarded as a peculiarly English form of literary expression. Few, however, of those who have rejoiced in it and its successors are aware that its author was a prolific landscape painter and a resolute traveller. His impressions of Albania, one of several little-known countries that he visited, are worth comparing with those recorded by Mr Edwards in the present number



Pelicans in the Gulf of Valona

"As we skirted these salt lagunes, I observed an infinite number of what appeared to be large white stones, arranged in rows with great regularity, though yet with something odd in their form not easily to be described. The more I looked at them, the more I felt they were not what they seemed to be. . . . So I resolved to examine them forthwith, and off we went, when—lo! on my near approach, one and all put forth legs, long necks, and great wings, and 'stood confessed' so many great pelicans, which, with croakings expressive of great disgust at all such ill-timed interruptions, rose up into the air in a body of five or six hundred, and soared slowly away to the cliffs north of the gulf. . . ."

And away they flew in a gathering crowd
Of endless birds in a lengthening cloud.
Ploffskin, Pluffskin, Pelican jee!
We think no Birds so happy as we!
Plumpskin, Ploshkin, Pelican jill!
We think so then, and we thought so still!

There are not many echoes of Lear the landscape painter in the works of the Lear who wove such exquisite nonsense; but this one seems authentic. His encounter with the pelicans in the Gulf of Valona took place in 1848, in the course of the journey described in *Journals of a Landscape Painter in Albania*, which he illustrated with his own lithographs. Not only do these pictures (some of which are here reproduced) convey a remarkably vivid impression of the Albanian landscape: the journals themselves carry the conviction of truth, which extends from what they reveal of the author to what they report of the country and its people.

For Lear the nonsense-maker, with his keen sense of the ludicrous and incongruous, of the perpetual booby-traps, the slips from pathos to bathos, that beset human life—he, at every turn of the road, has a comment to make. "In some meadows near a little stream flowing into the Peneus were several

camels. . . . I perceived a young one among the herd, and I rode a little way towards it spite of the clamorous entreaties of the Ioánnina muleteer. I had better have attended to his remonstrances for the little animal (who resembled nothing so much as a large white muff upon stilts), chose to rush towards us with the most cheerful and innocent intentions, and skipping and jumping after the fashion of delighted kids, thrust himself into the way of our three horses with the most facetious perverseness. One and all took fright, and the muleteer's reared, threw him and escaped. There was much difficulty in recapturing the terrified animal, and when we had done so, forth came the little muffy white beast once more, pursuing us with the most profuse antics over the plain, and rendering our steeds perfectly unmanageable. To add to our discomfiture, the whole herd of camels disapproving of the distance to which we were inveigling their young relation, began to follow us with an increasingly quick trot; and we were too glad to ford the stream as quickly as possible, and leave our gaunt pursuers and their foolish offspring on the opposite side."

The joke is on himself, even when it becomes painful. He enters Albania wearing a white wideawake hat, the "infidel air" of which is continually saluted by small stones and bits of dirt; whereupon he is urged by his dragoman to exchange it for a fez—advice which he ignores, and goes for a walk. "Seeing me unescorted, a crowd of the faithful took aim from behind walls and rocks, discharging unceasing showers of stones, sticks and mud. May my spectacles survive the attack! thought I, as forced into an ignominious retreat I arrived at the khan considerably damaged about the nose and ears, and not a little out of humour. . . . Henceforth I adopt the fez, for with that Mohammedan sign on the head it matters not how you adorn the rest of your person."

The headgear, however, has its defects: "To a man who wears spectacles, a fez is not advantageous as a covering for the head on a rainy day; the glasses are soon dimmed, and little does he see of all above, below, and around". Nor can the artist, even thus accoutred, exercise his vocation unmolested. "No sooner had I settled to draw—forgetful of Bekir the guard—than forth came the populace of Elbassán, one by one, and two by two, to a mighty host they grew, and there were soon from eighty to a hundred spectators collected, with earnest curiosity in every look; and when I had sketched such of the principal buildings as they could

recognise, a universal shout of '*Shaitán!*' burst from the crowd; and strange to relate, the greater part of the mob put their fingers into their mouths and whistled furiously, after the manner of butcher-boys in England. Whether this was a sort of spell against my magic I do not know; but the absurdity of sitting still on a rampart to make a drawing, while a great crowd of people whistled at me with all their might, struck me so forcibly, that come what might of it, I could not resist going off into convulsions of laughter, an impulse the Gheghes seemed to sympathise with, as one and all shrieked with delight, and the ramparts resounded with hilarious merriment. Alas! this was of no long duration, for one of those tiresome Dervishes—in whom, with their green turbans, Elbassán is rich—soon came up, and yelled, '*Shaitán scroo!—Shaitán!*'" ('The Devil draws!—the devil!') in my ears with all his force; seizing my book also, with an awful frown, shutting it, and pointing to the sky, as intimating that heaven would not allow such impiety. It was in vain after this to attempt more; the '*Shaitán*' cry was raised in one wild chorus—and I took the consequences of having laid by my fez for comfort's sake, in the shape of a horrible shower of stones, which pursued me to the covered streets."

This dark Satanic reputation is later turned to good account. "In the meantime I draw the portraits of two Mohammedan Gheghes of Elbassán, who come to visit my hosts. No sooner were these good people squatted in the little wooden gallery, with their garments, faces, and pipes in complete arrangement for my drawing, than a bit of india-rubber fell from my book; and making two small hops upon the ground, as is the wont with that useful vegetable substance when dropped accidentally, caused indescribable alarm to the two orthodox Gheghes, who jumped up and hissed at it, saying, '*Shaitán! shaitán!*' and trembling with horror as the little imp remained close to their feet. Nor did my taking it up calm their fears; and when I put it in my pocket, their disgust was increased at such ostentatious truckling to the comforts of a familiar demon. So as I found they could not be again induced to remain tranquil enough to be sketched, I seized a moment when they were not looking at me, and bounced the offending caoutchouc on the planked floor, when up it flew to such a degree that the unhappy and tormented Mohammedans screamed aloud, and shrieking out '*Shaitán! shaitán!*' jumped off the accursed platform and fled away."

Being armed with a *bouyourldi*, or general

order of introduction to governors or pashás, Lear calls upon Ali, Bey of Kroia, a youth of eighteen or nineteen. "At first Ali Bey said little, but soon became immensely loquacious, asking numerous questions about Stamboul, and a few about Franks in general—as to the different species of whom he was not very well informed. At length, when the conversation was flagging, he was moved to discourse about ships that went without sails, and coaches that were impelled without horses; and to please him I drew a steamboat and a railway carriage; on which he asked if they made any noise; and I replied by imitating both the inventions in question in the best manner I could think of—"Tik-tok, tik-tok, tik-tok, tokka, tokka, tokka, tokka, tokka—tok" (crescendo), and 'Squish-squash, squish-squash, squish-squash, thump-bump'—for the land and sea engines respectively—a noisy novelty, which so intensely delighted Ali Bey, that he fairly threw himself back on the divan, and laughed as I never saw Turk laugh before. For my sins, this imitation became fearfully popular, and I had to repeat 'squish-squash', 'tik-tok', till I was heartily tired."

Usually, however, he abstains from using his introductions; and although his health is far from robust, he puts up with hardships that would have tried the strongest. "Is it necessary, says the reader, so to suffer? and when you had a Sultan's bouyouirdi could you not have commanded Beys' houses? True; but had I done so, numberless arrangements become part of that mode of life, which, desirous as I was of sketching as much as possible, would have rendered the whole motives of my journey of no avail. If you lodge with Beys or Pashas, you must eat with them at hours incompatible with artistic pursuits, and you must lose much time in ceremony. Were you so magnificent as to claim a home in the name of the Sultan, they must needs prevent your stirring without a suitable retinue, nor could you in propriety prevent such attention; thus, travelling in Albania has, to a landscape painter, two alternatives; luxury and inconvenience on the one hand, liberty, hard living, and filth on the other; and of these two I chose the latter, as the most professionally useful, though not the most agreeable."

It was in the *Khans*, especially those of northern Albania, that he endured the hard living and the filth. "A Khan is a species of public-house rented by the keeper or Khanji from the Government, and is open to all comers. You find food in it sometimes—sometimes not, when you fall back on your

own rice and curry-powder. In large towns, the khan is a three-sided building enclosed in a court-yard, and consisting of two floors, the lower a stable, the upper divided into chambers, opening into a wooden gallery which runs all round the building, and to which you ascend outside by stairs. In unfrequented districts, the khan is a single room, or barn, with a raised floor at one end for humanity, and all the rest devoted to cattle—sometimes quadrupeds and bipeds are all mixed up together. First come, first served, is the rule in these establishments; and as any person who can pay the trifle required by the Khanji for lodging may sleep in them, your company is oftentimes not select; but of this, as of the kind of khan you stop at, you must take your chance. . . .

"Midnight,—O Khans of Albania! Alas! the night is not yet worn through! I lie, barricaded by boxes and bundles from the vicinity of the stable, and enduring with patience the fierce attacks of numberless fleas. All the khan sleeps, save two cats, which indulge in festive bouncings, and save a sleepless donkey, which rolls too contiguously to my head. The wood-fire, blazing up, throws red gleams on discoloured arches within whose far gloom the eye catches the form of sleeping Albanian groups. Bulky spiders, allured by the warmth, fall thick and frequent from the rafters ceiling. All is still, except the horses champing straw within, and the gurgle of the rapid river chafing without. . . .

"The principal event of the night was the donkey's walking unexpectedly into the fire-place, thereby causing a confusion in my nocturnal arrangements only to be remedied by a complete decamping. . . ."

The rough company that he met in such places gave him, despite his ignorance of the local language, an insight into social conditions from which he would have been debarred had he sought greater comfort. Within the previous two years many districts of Albania had been the scene of a general rising under a leader named Zulfki. The rebellion was sternly suppressed and, especially in the south, the people seemed "broken and dejected". But the travelling groups whom Lear met in the khans still had enough spirit left to "sing furiously about Zulfki till late in the night". Unfortunately, he found their mode of singing most unsympathetic. "They either make a feeble buzzing or humming over their tinkling guitars, like dejected flies in a window-pane, or yell forth endless stanzas of a whining, monotonous song. . . . There is a large party



TIRANA

of them in the next room to mine: four begin to form a sort of chorus; one makes a deep drone or bass; two more lead the air; and the remainder indulge in strange squeaking falsettos, like the whinings of uneasy sucking-

pigs." Only in the north, where Slavonic influences prevailed, did he hear "many melodious hummings, of which most of Albania seems guiltless".

Another characteristic of the Albanians



BERAT

that upset him—though it was one that they shared with the whole Moslem East—was their attitude to women. “As they labour pitifully up the rocky paths, steadying their steps with a staff, or cross the stony torrent beds, bent nearly double beneath their loads, they seem less like human beings than quadrupeds. A man’s blood boils to see them accompanied by a beast of a husband or brother, generally on horseback, carrying—what?—nothing, but a pipe! And when he is tired of smoking, or finds himself over-clad, he gives the woman his pipe to hold, or throws his capote over her load! The ponderous packages of wool, grain, sticks, etc., borne by these hard-worked creatures are hung to their neck by two strong straps; their dress is dark blue, with a blue handkerchief on the head—dark full trousers—no petticoat, or apron—and red worked woollen gaiters. They are short and strongly made in person, with very light hair; their eyes are almost universally soft gray, and very pretty, but the rest of the face, apart from the worn and ground-down expression, is too broad and square in form to be prepossessing.”

This attitude was not confined to the Moslem Albanians: Lear also encountered it among the Greek-Orthodox inhabitants of Khimára or ‘Acroceraunia’, the inaccessible district of the mainland opposite Corfu to which he paid a special visit. In reply to his question “How can you make your

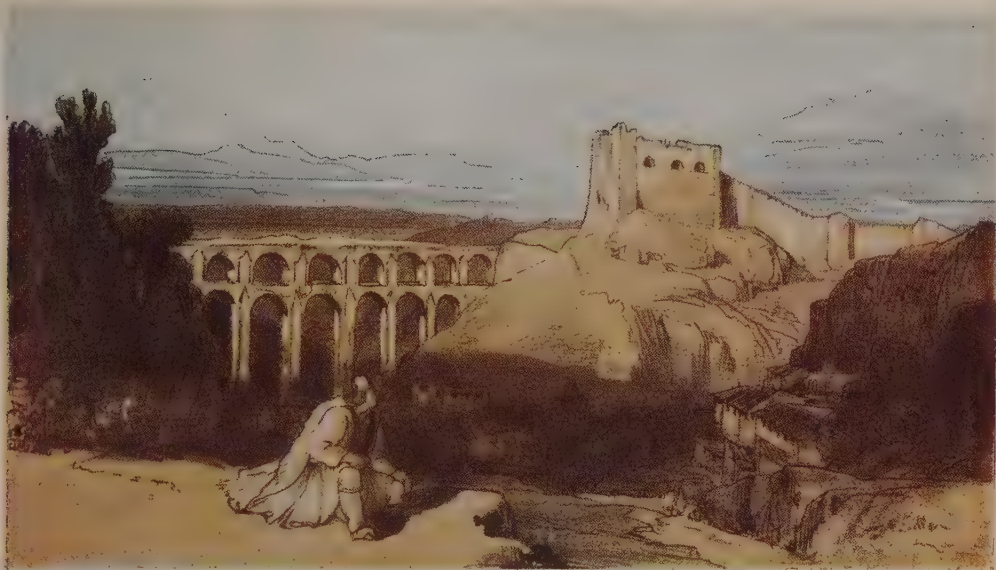
women such slaves?” his Khimáriot guide answered: “To you, as a stranger, it must seem extraordinary; but the fact is, we have no mules in Khimára, that is the reason why we employ a creature so inferior in strength as a woman; but there is no remedy, for mules there are none, and women are next best to mules. Although certainly far inferior to mules, they are really better than asses, or even horses.”

Khimára town, which gave its name to the district, lay on the southern border of Albania proper; and while the villages to the north were Albanian, all its inhabitants were of Greek origin and spoke Romaic. Lear sums up local feeling on the subject of nationality as follows: “Though the country opposite Korfú is distinctly known as Albanian, the innocent traveller who happens to speak of its natives to one of themselves as ‘Albanians’, finds himself in as wrong a position as if he should address Messrs. A and B and C, residents at the Cape of Good Hope, as so many Hottentots”.

Greece, indeed, which had so recently won her independence, was evidently a strong centre of attraction. The memory of Byron haunted many a spot; on two occasions Lear met men who had been members of his suite at Missolonghi; while Lear himself, referring to his visit to the ruined palace of Ali Pasha at Tepeleni, says that “of all days passed in Albania, this has most keenly interested me”.



KHIMÁRA



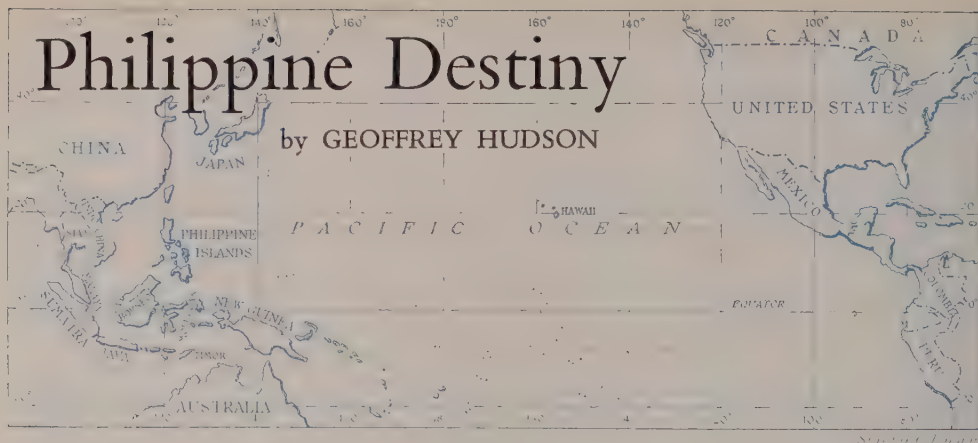
ARGYROKASTRO

For it was there that "the dreaded Ali gave audience to his Frank guests in 1809—when Childe Harold was but twenty-four years old, and the Vizir in the zenith of his power".

Argyrokastrë was the last town that Lear visited in what is now Albania; and here to his surprise he found a khan "in all ways perfection. Its galleries and stairs, of bright new deal, announced a cleanliness hardly to be looked for; while its ample new-boarded corner chamber, with large glazed windows, looking out on the castle and grand trees below it, presented a luxury beyond the reach of hope to have pictured." Here also he found the culminating point in a manifestation of Albanian life that never ceased to fascinate him: the variety and colour of local costumes, both male and female. Most of these dresses, which he describes in detail, pleased him greatly; but that of the Moslem ladies of Argyrokastrë excited only his amazement. "The quaintest monsters ever portrayed or imagined fall short of the reality of these most strange creatures in gait and apparel; and it is to be wondered at when and by whom the first garb of the kind was invented, or how human beings could submit to wear it. Suppose first a tight white linen mask fixed on the face, with two small slits cut in it for the eyes to look through. Next, a voluminous wrapper of white, with broad buff stripes, which conceals the whole upper part of the person, and is

huddled in immense folds about the arms, which are carried with the elbows raised, the hands being carefully kept from sight by the heavy drapery; add to these, short, full, purple calico trousers, and canary-coloured top-boots, with rose-coloured tassels;—and what more amazing incident in the history of female dress can be fancied?"

Lear could say in 1848 that "since the days of Gibbon, who wrote of Albania 'a country within sight of Italy less known than the interior of America', much has been done for the topography of these regions"; and it was true that a number of British travellers had written books on the country during the first half of the 19th century. But Albania is hardly better known in England in 1946 than it was then. British travellers at that time may have derived a certain advantage from the fact that each of them was treated with the respect due to a 'Milordos Ingliz', and from the support given by the British to the Turkish Government. The example of Edward Lear, however, inclines one to wonder whether they did not possess some other quality in which succeeding generations have been deficient; a zest for people and character, for "liberty and hard living", that might not carry a traveller to the interior of Greenland or the summit of Mount Everest, but would reconcile him to the dirt, the livestock, the noise, the smoke and the "fabulously filthy food" of the khans of Albania.



ON July 4 of this year the Philippine Republic is due to come into being as a sovereign state. The date for full independence was fixed by the Tydings-McDuffie Act which was passed by Congress in Washington in 1934. Today the Philippines form a 'Commonwealth' with domestic autonomy, but still subject to the ultimate sovereignty of the United States.

It is now 425 years since Magellan first saw on the horizon the mountains of the island of Samar which lies midway down the eastern

side of the Philippine archipelago. He was not seeking the Philippines, of which nothing was then known, but the Moluccas or Spice Islands further to the south—the source of the cloves and nutmegs so highly valued in the markets of Europe. The Portuguese, after their discovery of the Cape route to India, had reached the Moluccas in 1512 by way of the Malacca Straits. But Spain sought to break the Portuguese monopoly of the spice trade and Magellan, a Portuguese



(Opposite) *Manila is an old Spanish town with added characteristics of a modern American city. Through it various esteros (tide-water creeks) find their way. The old Walled City called Intramuros was mostly destroyed during the fighting last year and much damage was also done in the newer business and residential districts*

(Right) *The carabao or water buffalo is the principal farm animal in the Philippines; because of its non-porous hide it cannot live without frequent soaking in water, but this makes it very suitable for service in wet rice farming, the chief crop*

who had entered the service of Spain, suggested that the Moluccas could be reached by sailing west. Columbus had already sailed west from Spain to reach Asia across the 'Ocean Sea' and had run into the unknown continents of America; it had soon become apparent that the newly discovered lands did not belong to the east coast of Asia as known from eastward exploration and that a sea space must exist beyond them towards the west. If, therefore, a way could be found round the American barrier—which before the discoveries and conquests of Mexico and Peru yielded little of profit to Spain—it might still be possible to reach the source of the spice traffic by sailing on a westward course. It was with this aim that Magellan followed the coast of South America southward until he found the strait which bears his name and then, after passing through it, set his course across the unknown Pacific in what he believed to be the direction of the Spice Islands. His landfall turned out to be too far north and it was in this way that he became the discoverer of the Philippines. In crossing the Pacific he only sighted two uninhabited coral atolls until he reached the Marianas, the island chain about a thousand miles east of the Philippines; from the Marianas he sailed on westward until he sighted Samar on March 16, 1521.

Magellan did not land on Samar, but went on to other islands. On the small island of Limasawa, south of Leyte, he had Mass celebrated and took possession of the islands for the King of Spain; he named them the



Archipelago of St Lazarus because it was on that saint's day that he first sighted them. His first preoccupation was to get food for his crews, and in looking for it he came to Cebu, where there was a port for trade with China, Siam, Borneo and the Moluccas. Here Magellan was drawn into local politics and was killed in a skirmish on the neighbouring island of Mactan. After his death his captains took no further interest in the Philippines, but sailed south to Borneo and the Moluccas; one ship from his little squadron succeeded in returning to Spain with a rich cargo of spices round the Cape of Good Hope, thus completing the first circumnavigation of the globe.

After Magellan's voyage Spain sent two more expeditions across the Pacific in 1522 and 1527 with the Spice Islands as the main objective. The first of these followed Magellan's route, but the second sailed from the west coast of Mexico, which was now under Spanish rule. In 1529, however,



When the people of the Philippine plains were subdued by the Spaniards and converted to Christianity, the Igorots and Ifugaos, who inhabit a difficult mountainous area of northern Luzon, preserved their native customs and pagan religion. (Left) In an Igorot village: the Igorots are still different in many ways from the majority of their Filipino compatriots

Spain concluded a treaty with Portugal, recognizing the Portuguese claim to the Moluccas and fixing a line of demarcation some distance to the east of them. Strictly speaking, this should have left the Philippines in the Portuguese sphere, but Portugal had her hands full with the possessions she had already acquired and Spain was still unwilling to be entirely excluded from Asiatic waters. In 1542 another expedition under Ruy Lopez de Villalobos was sent out from Mexico with instructions to make settlements in the Western Islands, including the Philippines. The enterprise was a failure, but it

left its mark by giving the Philippines the name which they still bear. The name of St Lazarus bestowed on them by Magellan had never come into general use. Villalobos gave to the island of Leyte (recently famous for the landing of the American army of liberation in the war against Japan) the name of Felipina in honour of the Spanish crown prince who later became king as Philip II. Soon the whole group of islands came to be known as Las Felipinas or, in the English form of the name, the Philippines.

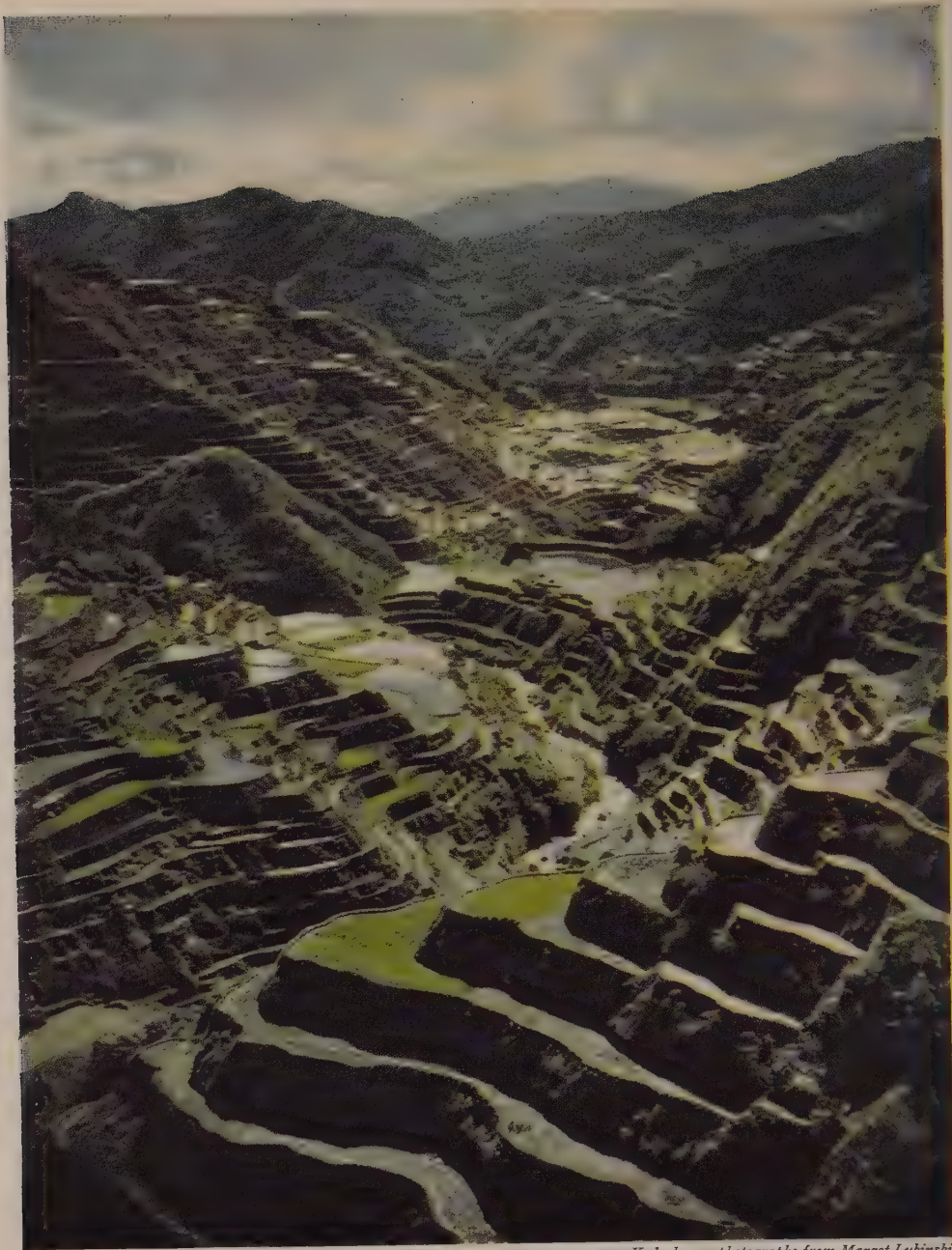
Geographically the Philippines are a northern extension of Indonesia. To the south-

The peasants of the plains are mostly tenants on large estates and the question of agrarian reform is now prominent in Philippine politics. (Right) A peasant woman of the island of Negros in the central Philippines. Apart from rice cultivation the main crop of this region is sugar, almost the whole of which was exported to the United States before the late war



west they are closely linked with Borneo and from a purely geographical point of view Palawan, the Sulu chain and Mindanao could be grouped just as well with Borneo as with Luzon. Racially and culturally, apart from the Spanish conquest, the Philippines are not clearly marked out from the rest of Indonesia; all the languages spoken in the Philippines belong to the Indonesian family common to Malaya, Sumatra, Java and Borneo and the variations of physical type characteristic of the Filipinos are also to be found all over western Indonesia. In civilization, before the coming of the Spaniards, the

Philippines shared in the developments common to the Indonesian sea world, but they were remote and peripheral compared with Java and Sumatra and remained on the whole at a more primitive level of culture. Some tribes inhabiting the mountains and forests lived only by hunting and fishing; remnants of them still survive under the name of Aetas in the more inaccessible regions of Luzon, Mindoro, Panay and Mindanao. Most of the people of the islands, when the Spaniards arrived, were cultivating the soil and carried on overseas trade; there were even some centres of population large enough



Kodachrome photographs from Margot Lubinski

Terraces for growing rice, built by the primitive but skilful Ifugaos in the mountains of Luzon. The terrace walls are made of rock and clay and irrigation water is supplied through bamboo pipes

to be called towns and local rulers with palisaded strongholds and even cannon bought from Arab traders. But there was no supreme central power; what is now the Philippine Commonwealth was not then a political entity nor had it any regional name given to it by the natives. It is fitting that the archipelago should retain the name of a Spanish king, for it was Spain which gave shape and unity to the Filipino nation. It is significant that the Filipino nationalists have not tried to change the name of their country, though some of the flatterers of the late President Quezon suggested that it should be renamed after him.

The actual possession of the Philippines, or at least of key areas within them, was assured to Spain by Miguel Lopez de Legaspi who set out from Mexico in 1564 with four ships containing 150 sailors, 200 soldiers and six priests. By a skilful mixture of force and diplomacy he first subdued Cebu; later he captured the town of Manila and made it the capital of the new Spanish colony.

The conversion of the natives to Catholic Christianity, as in all parts of the Spanish empire, went hand in hand with military and political expansion. In the 16th century the great majority of the inhabitants of the Philippines had no highly organized religion; they were 'pagans' attached to vague animistic beliefs and cults which varied from place to place. The exception was the area of Moslem faith; Islam had been introduced from the south-west in about 1400 and spread, partly by immigration and partly by conversion, mainly in the Sulu Islands and Mindanao and in scattered coastal districts as far north as Luzon. Manila itself was a Moslem settlement. The Spaniards, meeting Moslems at the end of their westward travelling from Spain, called them Moros, that is to say Moors, though of course they had nothing to do with Morocco; the name is still in use in the Philippines. Islam was much more resistant to Catholicism than the native paganism; Moslems are notoriously difficult to convert and in the Philippines the Moslems of the Sulu Islands, who were bold and skilful sailors and could muster a considerable fleet, were the most formidable military opponents with whom the Spaniards had to deal. As a result of this situation the Philippines became, broadly speaking, a Christian country with a Moslem minority in the extreme south. In the open plains the 'pagan' Filipinos were everywhere converted to Catholicism, and only some tribes in difficult mountain areas, such as the Igorots of northern Luzon, continued to adhere to the



Stanford, London

old religion. Islam also disappeared in Luzon and the central islands (the Visayas, as they are called), as the Moros were either converted, killed or driven out by the Spaniards, but in Sulu and Mindanao they remained as a separate community under their own rulers and were never really subdued by Spain until the middle of the 19th century, when the steamship at last gave the Spaniards a decisive advantage over their extremely fast and manœuvrable sailing craft.

The Philippines are the only Asiatic territory where European colonization in modern times has resulted in the mass conversion of a large native population to Christianity. This has been a fact of the greatest importance in the history of the Philippines, for it has given the Filipinos special links with the West not shared by other Eastern countries. In India or Burma, in Java or Annam the indigenous population as a whole retained its old religion and the culture associated with it, while the European colonizers remained as a small minority of officials and soldiers, traders and planters, culturally detached from the life of the people. In the Philippines, on the other hand, although the Spaniards continued to be the ruling nation and their rule was often oppressive, the Filipinos, by sharing a common religion with their rulers, were able to enter into their mental life, as was not possible elsewhere in Asia. The



Ewing Galloway

The Augustinian church at Cebu, the oldest city in the Philippines. In it is housed an image of the Holy Child, said to date from the period of Magellan's landing in 1521. At that time the great majority of the Filipinos were 'pagans' with no highly organized religion, a fact which made easier their conversion to Catholic Christianity

lower ranks of the clergy were recruited from the Filipinos and by their education were brought into contact, even if remotely, with the development of European thought, and as they were the spiritual leaders of their people, their Western training did not separate them from their fellow-countrymen as it long isolated the Westernized intelligentsia in other Asiatic countries. In consequence of their Catholicism and the absence of strong native cultural tradition the Philippines have indeed followed a strange destiny. Geographically they belong to Asia, but by history they belong to Latin America. They were an enclave of the Spanish empire on the Asiatic side of the Pacific; they were normally reached, not by direct voyage from Spain, but from Mexico, and the way of life established there after the conquest was very similar to that which prevailed in Spanish Mexico or Peru. Spanish was never so widely spoken in the Philippines as in the Spanish colonies of North and South America, but it was in general use among Filipinos of the upper class, who dressed in Spanish fashion and attended the churches of baroque

architecture which were everywhere the main feature of town and village in the Christian areas. In Manila the Dominican University of St Thomas was founded in 1619; it is today the oldest university in territory under the United States flag.

As the Philippines were for so long virtually an extension of Spanish Mexico, it was historically appropriate that, after the ending of Spanish rule, they should have come under the control of another North American power. In fact, the American annexation in 1898 can almost be regarded as a restoration of the Philippines to the orbit of the Western Hemisphere. When Spain's American colonies, including Mexico, revolted and gained their independence early in the 19th century, the Philippines remained in Spain's possession, but they now had to be controlled directly from Europe; no longer could Spanish ships sail to Manila from Acapulco, the Mexican port which had the monopoly of Philippine trade in the 17th and 18th centuries. The Philippines became a territory at the end of an eastward sea route from Spain—round the Cape of Good Hope or, after



A. E. Lilius, from "Odyssey of the Islands" (Scribner's)

"Islam was much more resistant to Catholicism than the native paganism." In the southern Philippines the Spaniards encountered the Moslem 'Moros' who long resisted Spanish conquest, remaining in Mindanao and the Sulu Islands as a separate community under their own rulers. Their swift vessels still skim the waters of the Sulu Sea

1869, through the Suez Canal.

During the 19th century a national independence movement grew up in the Philippines. It was democratic and republican in conception and drew its inspiration through Spanish liberalism from the French Revolution. The Spanish Revolution of 1868, brief as it was, gave a great impetus to democratic ideas in the Philippines, and subsequent attempts to suppress them led to plots and revolts. The leaders of the national movement in the early stages were either priests or lawyers and through the former it penetrated deeply among the masses of the people. In 1872 after a revolt at Cavite three Filipino priests charged with complicity were executed; they were acclaimed as martyrs. Another leader was the poet and novelist Rizal, who was executed in 1896; he is today the supreme national hero and a statue to him adorns every important town.

In 1896 a general rising against Spanish rule broke out, and fighting was still going on when the Spanish-American War began. The subject of dispute between Spain and the

United States was Cuba, not the Philippines, but the war spread to Asiatic waters and an American naval squadron under Commodore Dewey destroyed a Spanish fleet in Manila Bay on May 1, 1898. Three weeks later the Filipino rebel leader Aguinaldo proclaimed the independence of the Philippines and soon the government which he set up was in control of nearly all Luzon and the Visayas. Manila surrendered to an American army and in the Spanish-American peace treaty which concluded the war sovereignty in the Philippines was ceded to the United States. Meanwhile a Philippine Congress meeting at Malolos near Manila had framed a constitution and established a Philippine Republic. The American Government took the view that the Filipinos were not yet ready for self-government and refused to recognize the Republic. As it turned out, the American campaign against Spain in the Philippines was a mere preliminary to the much more strenuous and prolonged war against the Filipinos which had to be waged before American authority could be made effective. Fighting began in February 1899 and only ended with the surrender of General

Malvar in Batangas in June 1902.

The United States had conquered almost in that 'fit of absence of mind', which is said to have been the condition of British empire-building. The Americans, lacking colonial experience, did not make a good beginning; American military rule, as enforced by the notorious General "Hell-Roaring" Jake Smith, was far from being a model for European colonial powers to imitate. But American public opinion was deeply stirred by a sense of responsibility for the territory which had come under the flag of the United States. Military rule was brought to an end even before fighting had ceased and a civil administration set up on July 4, 1901. From that time it has taken the Filipinos just forty-five years to achieve full independence, but the progress has been made in a series of steps which has given time for consolidation at each stage and the final phase—since 1934—has had a legally dated time-limit, so that the Filipinos have been able to see their way ahead more clearly than if they had merely had to rely on promises for an indefinite future.

American policy in the Philippines since 1901 has reflected a genuine desire to promote self-government in accordance with American democratic ideas; it has also been conspicuous for the special importance it has attached to education. Numerous schools were set up in the early days of American rule, and so much did the Filipinos appreciate this that American teachers could always go unharmed even in districts where brigandage was rife. The development of institutions of self-government, first local and then national, combined with the wide diffusion of education, have given the Filipinos a degree of democratic political consciousness in advance of any other Asiatic people, and for this the Americans can claim due credit; on the other hand, when they contrast, as they so often do, the recent record of the Philippines with those of adjacent territories under the rule of other Western powers, they are inclined to forget that before the American conquest the Hispano-Catholic Filipino was already far more accessible to liberal Western influences than the Hindu or Moslem and that much of the Filipino political development took place before the Americans arrived. The Malolos Republic of 1899 was a remarkable political creation which did not owe anything to American guidance.

The Filipinos have felt themselves to be independent since 1936 when the American Governor-General became a High Commissioner and vacated the Malacañan, the old

palace of the Spanish Governors, in favour of an elected Filipino President—the able and eloquent Quezon. Foreign affairs, defence and a power of veto on legislation were to remain with the President of the United States for another ten years, but internally the Filipinos enjoyed plenty of scope for their abilities. Perhaps the most serious defect of this interim régime was that the Filipinos in general felt no responsibility for their own defence; they relied on Uncle Sam to provide for that, and in 1941 they took it as a great grievance that they were expected to pay for air-raid shelters in Manila. The Filipino troops under General MacArthur's command fought well against the Japanese invaders, but many of the civilian politicians accommodated themselves rather too easily to Japanese domination; the cleavage between resisters and collaborators (or those accused of being such) has remained since the liberation as a factor of embitterment in Filipino politics.

As a nation the Filipinos have felt that they must have a national language of their own. They have adopted for this purpose a modified form of Tagalog, the language of the Manila region, but a number of other native languages are spoken in other parts of the Philippines and not until a new generation has been taught Tagalog in the schools will it be a real bond of unity among Filipinos. Meanwhile educated Filipinos get along with English or Spanish, the former being now much more widely used than the latter, but neither being confined to any one part of the country.

The Philippines have suffered terrible devastation during the war. Manila and other towns have been laid in ruins, the mines and sugar mills were stripped of machinery by the Japanese, and farm cattle were slaughtered for food so that rice production has greatly declined. The new Republic will thus be born in much less prosperous and happy circumstances than was expected when the Tydings-McDuffie Act was passed twelve years ago. But the United States Congress has now passed legislation to provide economic assistance to the new State and allow it to remain for the time being on the inside of the American tariff enclosure. In defence the two nations will be closely associated, and it is expected that the United States Navy will in future have at least one major fleet base in the archipelago. The independence of the Philippines will not alter their trans-Pacific orientation. America's frontier remains where the mountains of Bataan rise from the waters of the South China Sea.

After two-and-a-half years of Japanese occupation, powerful United States forces under General Douglas MacArthur landed on Leyte Island in the Central Philippines on October 20, 1944. The town of Ormoc was liberated in a night battle on December 14 and the American troops pressed on rapidly against the enemy through its muddy streets



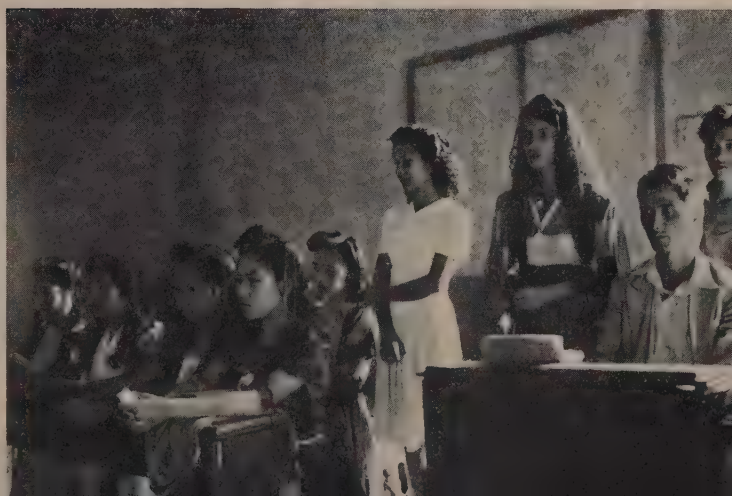
By courtesy of U.S.I.S.

By December 24 Leyte and Samar Islands were free of enemy domination and a Civil Affairs Unit, sponsored jointly by the Governments of the United States and the Philippine Commonwealth, helped the Filipinos to put their house in order. An early step was the reopening of schools in the liberated areas, and with it the renewal of instruction in English



By courtesy of U.S.I.S.

Then came the liberation of Luzon. Manila was entered on February 4, 1945, and on February 26 General MacArthur restored responsibility for civil affairs to the Philippine Commonwealth Government. The Catholic Filipinos attended thanksgiving services in their churches and resumed the course of a strange destiny; geographically belonging to Asia, but linked across the Pacific by ancient and modern ties with the Americas



By courtesy of U.S.I.S.

Boarding House or Butlin's ?

By H. D. WILLCOCK



All photographs by Margaret Lubinski

Most questions including the word 'where' require a geographical answer. In the following article the author, who is co-director with Tom Harrison of the social research organization Mass-Observation, considers possible answers to a question that now confronts more British families than ever before: "Where shall we go for our holiday?" The author wishes to acknowledge his debt to the National Council of Social Service's report Holidays for factual data on the post-war holiday demand

OF the five holiday months in England and Wales, May is the driest, June the sunniest, and July the hottest. On average, during two-thirds of a century since the Act was passed which first made August Monday a close holiday in banks, August has been the wettest month of the five.

But people have their own private impressions of the weather. To get an idea of the extent to which the weather facts are known Mass-Observation recently asked 100 Londoners selected at random which they *thought* were the hottest, driest and sunniest months. We also asked them which month they would choose to go away

if they could go at any time. The results were:

Month	Percentage of People thinking this Month is usually—			Percentage wanting to go away this Month
	Hottest	Driest	Sunniest	
May . . .	2	2	2	2
June . . .	16	26	34	25
July . . .	26	13	27	20
August . . .	36	21	20	19
September . . .	7	13	7	25
Other months . . .	1	10	6	3
No idea . . .	12	16	7	8

(Where, as occasionally happened, people mentioned two months, both are counted. Percentages thus total over 100.)

Most people are wrong in each case. They are best informed about the sunniest month. We found that two out of five people's ideal holiday-month was the same

Holiday camps offer an alternative to the boarding house which, for the first time, caters to the needs of the whole family unit. Highly competent large-scale organization is required. At Butlin's Clacton camp, with accommodation for 2500 campers and a staff of about 500, three clerks are needed to deal with the ration books. Thermo-statically controlled trolleys, each holding 128 plates, can serve the whole camp with a three-course meal in 20 minutes. 'Radio Butlin' keeps the time-table going, reminds campers through loud-speakers of special events, broadcasts music

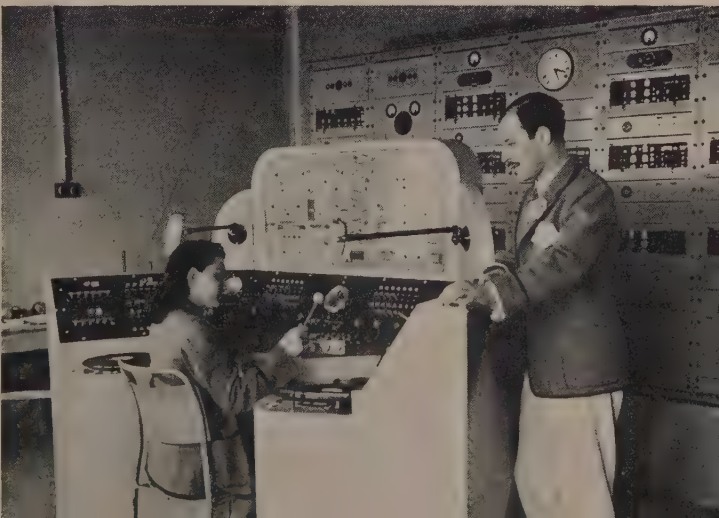


as the one they *thought* had most sunshine. But over 60 per cent of them had picked the wrong month!

These results suggest that a good deal can be done to relieve holiday congestion by means of educational propaganda and staggering. There is little sign of an August peak in people's holiday *desires*, and the importance of weather extremes may well be exaggerated. Although one person in ten believes that their ideal holiday month is both hottest, driest and sunniest, 40 out of 100 want to go away during a month which they believe is none of these things.

But effective staggering is a long-term project. The habit of taking a holiday which includes August-week will take time to break down, and before families containing school-age children can spread their holidays a revision of school curricula and the examination system is needed.

Moreover the present holiday crisis can only be very partially alleviated by staggering. The number of people who want and are able to afford a holiday away from home now can only be roughly estimated, but even a conservative estimate shows an enormous increase since pre-war days. In the peak pre-war

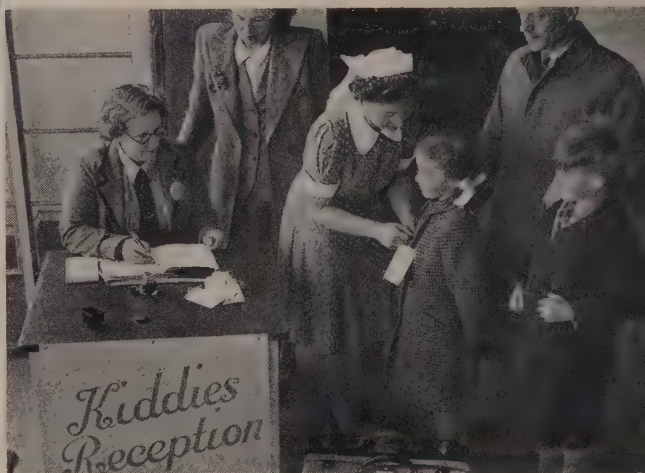




holiday year (1937) it has been estimated that 15 million people went away. This seems a lot until you realize it means that *two-thirds of the population stayed at home*. Since then arrangements under the Holidays with Pay Act (1938) have entitled 11 million new workers to paid holidays every year. With their dependants they represent over 20 million new potential holiday-makers. Most of them could not afford a holiday before the war, and most of them will be able to afford one, at a reasonable price, now. Add the fact that hundreds of thousands of people have been accumulating holiday nest-eggs during the past six years in the form of gratuities, post-war credits, higher pay with less to buy, and the cumulative results of full employment over a long period. Remember that more thousands have skimmed or forgone their usual holidays during the war, and are in urgent need of real recuperation now. It seems highly probable that the real demand for accommodation is at least double the pre-war level. And the supply has been reduced by bombing and other factors to an estimated temporary level of about three-quarters of 1939.

Twice the number of people and three-quarters the number of rooms. While the war was still on,

By making provision for children, holiday camps can give Mother a real holiday. At Butlin's camps children over two are accepted. They are specially registered in their age-groups, to make organization of 'fun and games' easier, and each receives a label with name and chalet number



In the daytime children can be left in charge of trained attendants in the camp nursery; at night a nurse patrols the chalets and, if her efforts to comfort a crying child are unsuccessful, can summon the parents with the aid of her list of their names and whereabouts. At 10.30 p.m. all parents must collect their chalet keys from the nurse on duty





Thus the housewife, besides being relieved of shopping, cooking and housework, is enabled to get the children off her hands without anxiety and to be alone with her husband, perhaps for the only time in the year. Nor are the advantages of this arrangement confined to them

The entertainment staff show inexhaustible ingenuity in providing amusements suitable for children of different ages. 'Uncle Boco' leads a morning party off to the beach for a sand-castle competition; in the afternoon participants in a fancy-dress competition enjoy a Punch and Judy show; experts in grown-up sports apparatus let daring youth try its skill

thousands of people travelled in packed trains to seaside resorts where their chances of finding anywhere to sleep were negligible, because they wanted a holiday badly enough to face any discomfort in order to get a break. It may happen on a bigger scale this summer. Alternatively, the fantastic prices of accommodation, which have been widely noticed in the newspapers, may reconcile many to the inevitable. But if the demand is temporarily masked in this way, that is no solution. If people are compelled to stay at home, with all the monotony and familiarity of a week of routine Sundays, most of the potential benefit of Holidays with Pay will be lost.

What is the solution? There is no immediate one. Many people will have to be disappointed this year, and many more will have to spend their holidays in pretty acute physical discomfort. But holiday-planning and holiday-catering on a grand and unprecedented scale are going to be an outstanding feature of the next few years. Rapid changes in the appearance of Britain's coast are to be expected. New towns will spring up and old towns expand. And in the midst of these changes appears a new social phenomenon, the Holiday Camp. It is the purpose of this article to discuss





Proficiency in sports is encouraged at Butlin's camp by the employment of well-qualified instructors: (left) Jos. Crowther, who represented Britain at the European Games in 1938, teaches would-be swimmers how to breathe

All such coaching, whether for children or grown-ups, is provided without extra charge; and so is regular physical training instruction for those who wish to improve their health by joining the (opposite) daily Keep Fit Class

the Holiday Camp idea in its historical and social context.

Since seaside holidays became fashionable, and with accelerating speed as more and more people have been able to afford them, the coast of Britain has been 'developed' for the holiday trade. Blackpool was a fishing village within living memory. Turning back photographs of childhood holidays, few middle-aged people will find a scene remotely resembling today's. For those who still prefer nature to concrete proms and ornamental gardens, the choice has narrowed year by year. If, in order to cater for a double quota of holiday-makers, history repeats itself in this generation, the coast may well become one continuous esplanade.

Blackpool rather than rock-pool, will no doubt remain the prototype of holiday towns in this age. But even Blackpool, with all its outward splendour, has its disadvantages, which are those of any little seaside town grown big too quickly. It caters on a grand scale for the psychological holiday needs, provides a dream environment where all the work-week values are reversed, where Lancashire cotton workers can behave differently, dress differently, see different things and think different thoughts for one week out of fifty-two. The psychological and emotional holiday, for those who need this type of change, is pretty well complete. But behind the municipal dream-machine of any big seaside

resort today lie the warrens of boarding houses and private hotels, an untransmuted physical background. In surroundings totally different from those in which they were once built, they carry out a function for which they were never meant.

No one is to blame for the boarding house 'system'. It is a fortuitous and unplanned growth from the time when holidays were a middle-class privilege, and watering places contained many fashionable residences of the well-to-do. At first there were apartment houses, to which whole families came, occupied several rooms or the whole house, and generally transported to the seaside those provisions for adult leisure to which they were accustomed at home. The landlady did the catering, to her guests' specification, and a maid or nurse was often included in the family party. If Nanny did not come, being together all the time was often a welcome and beneficial change for both parents and children. Only forty years ago Mrs Beeton, in her famous cookery book, was urging the middle-class housewife to "devote some part of her time at any rate to the children. She will not find an hour wasted in this way, even if it be one hard to spare."

The old apartment houses were too big for the new holiday-makers, most of whom could only afford one, or at most two rooms. Meantime the fashionable residences fell vacant, either because their owners could no



longer afford the upkeep or because the neighbourhood was no longer fashionable. Both became boarding houses. Here several unrelated families with several unattached guests now live for a week or two in closest proximity, and make the best of what is often a very bad job. Working mothers, unlike their middle-class predecessors, find no change in having complete charge of their children, only a wearisome continuance of the usual home routine, without the home amenities, and with the added anxiety of living in a house among unknown people, who must not be irritated or disturbed. "It's no holiday with the kids," as so many mothers have so often remarked at the end of their week's 'break'.

Of course, no one planning a new mass holiday resort today would take the boarding house as his basic unit for housing families. But where they are now, there they are likely to remain, an accidental by-product of social change. They have survived partly by adapting themselves to circumstances, but equally because there has been an ever-increasing demand for accommodation of any sort, and competition has hitherto been so slight. Till recent years there has been no widely available alternative at a comparable price.

Two new developments were under way when the war put a stop to holidays. First, more and more people were taking their holi-

days *outside* the big resorts—hiking, biking, camping, staying in youth hostels or in guest houses under the auspices of some organized body. The Youth Hostels Association, founded in 1929, multiplied its membership by nearly six between 1930 and 1934, and more than doubled it again by 1938. The Camping Club of Great Britain and Ireland, founded over forty years ago, had a membership of 5450 in 1930, which had increased to 12,859 by 1938. In that year the Camping Club estimates that half a million people spent three nights or more under canvas. The Workers' Travel Association provided 48,000 guest-weeks for its members in country houses in 1938, compared with 18,000 in 1930.

The majority of these new holiday-movements were born and grew rapidly between the wars. They provided the first large-scale alternative to the boarding house, but by their nature they mostly excluded the couple with young children, and their attraction was confined to those who did not need cinemas, dance-halls, fun-fairs, etc. to make their holiday complete.

Then came the holiday-camp idea. Before the war these camps were appearing in various parts of the country, inland as well as by the sea, some small and with little organization, others bigger and highly organized. In origin they were little more than a more planned development of the wooden holiday-bungalow estates which had already appeared



If you want to sit still and rest at a Butlin camp, you can—either in a deck-chair in front of your chalet, or on the beach, or in the Sun Lounge with its big glass windows. But if you feel active, printed programmes and loud-speakers give you a great variety of choice. In the open air you may try a sports competition, or a 'bike hike' on the Butlin bicycle (two coupled together: no skill needed), or a visit to the fair outside the camp grounds. A roller-skating rink is outside at Clacton, but inside and inclusive at the other camps



in many small seaside towns, and often where there was no town previously at all. These in turn can often be traced back to a ramshackle and anarchic medley of converted buses, shacks, army huts and even hen-houses, which pioneered 'development' on a lonely stretch of coast. In one east-coast village known to the writer, a retired undertaker used to spend his holiday in a converted hearse amid the general architectural chaos. A few years earlier there had been little but sand dunes and old farm-houses visible; a few years later green and yellow bungalows began to dot the coast fields; and shortly before the war an organized 'camp' of bungalows appeared in the neighbourhood.



All three stages are symptomatic of the desire of families to holiday in a place which is *all* their own. In the converted bus stage, which often reached considerable proportions before the next phase set in, they often sacrificed *all* amenities to this end. No water, no sanitary arrangements, no gas or electricity, no shops, no cafés, certainly none of the usual attractions of even a small traditional seaside resort. But also no landlady, no card of rules and regulations in the bedroom, no fellow-

Indoor recreational opportunities, prescribed by the British climate, include a weekly 'Holiday Lovelies' contest (here guest star Minto Cato from Show Boat, London, is shown congratulating the winner); afternoon dancing; weekly boxing or wrestling matches; concerts; camp theatre or variety show; as well as all sorts of indoor competitions, the winning of which not only brings an individual prize but also, as the campers are divided into 'Houses', improves the chances for the winner's House in the weekly inter-house contest



guests to risk offending.

Next came the bungalow settlements, deserted outside the holiday season, with no other function than that of housing a series of temporary guests. They had many advantages for families over boarding-house holidays, but they left the housewife with *all* the usual work of the home to do—shopping, cooking, housework, and looking after the children. Boarding houses at least provided meals and made the beds.

In Sweden, a year before the war, a Commission was set up to examine the case for state support for housewives' holidays. The Commission, which reported in 1942, recommended that the Government should coordinate, stimulate and financially aid organizations sponsoring housewives' holidays. Though they considered the complete family holiday preferable, the fact that the only type of accommodation available for poorer people involves more, not less, work for the housewife, suggested this compromise. Separate, but adjacent, accommodation for mothers and children was advocated.

Is this the only answer—separate holidays for wife and husband? Out of the holiday



camp idea there arises another alternative, quite different from anything available before. In these camps you will find the familiar bungalows or chalets, one per family or one per couple, but instead of an anarchic community in which each family unit looks after its own problems, a permanent central organization devoted entirely to taking the work and responsibility off the campers' hands.

Of these camps Butlin's are the most widely known and have shown the most phenomenal growth of all new holiday schemes. The three Butlin camps at Filey, Clacton and Skegness cover an area of over 600 acres and together can accommodate 12,000 visitors a week during a season lasting from March to November. Used for military training during the war (Skegness was the famous battleship *Royal Arthur*, sunk so many times by the Germans), they have been refurbished for holiday use in double-quick time. Two more—at Pwllheli and Ayr—are due to open next year, and another is planned in the Channel Isles.

Mr Butlin started in business in 1921 with a £5 hoop-la stall at a fair. Today his firm owns 13 amusement parks as well as his holiday camps. Butlins Ltd. earned a net profit of £183,000 last year. Outstanding share and loan capital amounts to £880,000, including £315,000 in 1s. ordinary shares (which stand, at the time of writing, at 17s. 7½d.). An issue of £850,000 preference and debenture shares in Butlin Properties Ltd. was over-subscribed to the tune of £20,000,000 this May, applications arriving by the sackful, many of them from small investors.

There is no doubt that holiday camps have come to stay, grow and multiply. They offer an alternative to the boarding house which, for the first time, applies to everybody—the whole family unit. One point must be singled out as entirely new, namely the provision for children. At Butlin's camps children over two are accepted. They can be left in the camp playrooms in charge of trained attendants, if desired, during the day. Special games and amusements are organized for them, and at night they can be left in bed in the chalet without anxiety, in the assurance that the Chalet Patrol will summon the parents over the camp loud-speaker if they are needed. Thus, often for the only time in the year, husband and wife can be alone together as often as they like.

It is the aim of Butlin's camps to provide all the amenities at an all-in rate (at present tariffs range from £5 : 5s. a week to £6 : 16s.,

according to season). This includes accommodation and food (separate tables, with cloths and dinner napkins, each seating 4-8 campers; thermostatically controlled trolleys, each holding 128 plates, can serve the whole camp with a three-course meal in 20 minutes); all amusements and entertainments (dancing and camp theatre, games, coaching, competitions, roller skating and boating where these are laid on, come under the all-in scheme); hot baths and showers. The advantage for holiday budgeting is obvious. The rate may be higher than people would expect to pay in a boarding house, but the anxiety of running out of spare cash before the holiday is over is largely resolved.

The main criticism one hears of holiday camps are the old ones to do with spoon-fed leisure, illuminations replacing the moon, dance-saloon and music-hall instead of nature. In a sense Butlin's camps, with their staff of forty entertainment officers, with their nurses, first-aid posts, division of campers into competing 'Houses', and general provision of everything, laid-on, in the grounds, are certainly spoon-fed. In another sense the choice is so wide that it must require some discrimination to choose between the innumerable alternatives. The male entertainment officers are called "Red Jackets" and wear spick sporting blazers. As for the other sex, there is a competition on now throughout the Gaumont-British cinema circuit to find the Holiday Princess of Great Britain. She will get £250 cash, and a two-years' appointment as hostess at one of Butlin's camps at a salary of £500 per annum. Qualifications: Audience Reaction; Health and Beauty; Grooming and General Deportment; Good Figure; Intelligence, Charm of Voice and Manner.

As for nature, the net effect of holiday camps may well be to leave more of her available to those who want her rather than less. They will be concentrated units, compactly planned, where otherwise there might have been straggling, unplanned development in a dozen places on a smaller scale. And no one is qualified to carp at spoon-fed leisure, bright lights and perpetual organization, who has not spent years, like most of today's holiday-makers, on a routine job in a factory, and lived their lives in a factory town. If Black-pool and holiday camps are a 'bad thing', they are rooted in the inadequate fulfilments for the majority of fifty-one work-weeks out of fifty-two. They are a symptom of our kind of civilization, and it is up to anyone to attempt a diagnosis. The certain fact is that they represent what millions of people want.

Making Malaya a Nation

by GUY ROBERTS

The East Indian region has been the focus of convergent influences—Indian, Arab, Chinese and European—that are all reflected in its population and economic life. These influences, complicated now by rapid political development among the indigenous people, were the subject of Mr Roberts' articles in our January, February and March numbers. In the following final article he sums up various factors of human geography that affect the British task of nation-building in Malaya

THE Indian Ocean has been called a British lake. At the end of the 18th century this description was apt, but during our own times the relations between Britain and the territories round that ocean have been undergoing many changes. In implementing its policy of devolving the function of government upon local institutions, Britain has implanted political ideas round the Indian Ocean by starting many experiments in national structure. One climax of such experiments is now being reached in India where a territory which has failed to maintain political unity in the past is about to be established as an independent state. Similar experiments in political synthesis have gone on in those parts

of the Middle East adjoining the Indian Ocean—in Iraq, Saudi Arabia, Egypt and Transjordan. Further east, Burma became what was virtually a Dominion until the Japanese destroyed it: Ceylon's new constitution is a step in the same direction. As a French writer, Y. M. Goblet, has said, round the Indian Ocean a very fine chapter in the history of Britain's political heritage is now being written, even though it is the habit of British people to ignore the process of evolution they are furthering. Hence today the Indian Ocean may be said more properly to resemble a political greenhouse where disjointed territories are being nurtured into nations and where nationality is being cultivated to blend



Stanford, London

Malaya's political pattern and river system

Location of tin fields and rubber plantations

miscellaneous people. In this sense, the union now proposed for Malaya is the latest attempt at political unification.

Earlier articles in this series showed that Malaya has never been a political entity. Its history is a note in the margin of the annals of Indian expansion, Chinese migration and European economic development. It is less than a century since the world merely skirted Malaya as it still skirts Borneo. But the proposals to establish a Malayan Union have drawn many references to the interests of Malays, those people ethnically allied to the Sumatrans and Javanese, who find themselves faced with the possibility of being swamped by the people and interests which have converged upon Malaya. We may reserve the word 'Malayan' to describe all those, whether Malay, Chinese, Indian, European or Eurasian, who have resided in Malaya long enough to identify themselves with that country.

To some, it has come as a surprise that there are nine separate Malay sultanates in the Peninsula, each of them claiming a sovereignty recognized in a series of separate treaties with the British. This political mosaic in so small an area (about equal to the United Kingdom) may be likened to that in Britain at the time of the Saxon Kings, seven of whom once ruled simultaneously in different parts of England.

England at that stage and Malaya in the middle of last century were so difficult to travel in that local autonomy was perfectly natural. It was improvement of transport and communication rather than the ability of any individual which unified England—and the same tendency to merge authority went on in Malaya once modern technicians began to solve the problems of tropical jungle.

Previously the only channels of communication through so marshy, mountainous and thickly jungled a country as Malaya, were the rivers. These, and inshore sailing up and down the coasts, were the Malay highways, beside which grew up the Malay villages. The Malay avoided the jungle whenever he could. Hence, the Malay political units, the sultanates, centred almost entirely upon rivers and the ribbons of villages along their banks. The jungles in between the rivers formed a no-man's-land, a natural barrier between the chieftains of different valleys. Where the main rivers came to the sea, that is, where the river traffic joined the coastal shipping, was a strategic point controlling both routes. Thus the Malay sultanate pattern was T-shaped, to be seen in Kedah for example, where the Kedah River is the main artery, joining the sea not far from Alor Star, the

sultan's seat. The form is repeated in Kelantan, Trengganu, Selangor and Pahang, sultanates where the pull of modern economic forces has not been great enough to force Malay settlements into new patterns. Johore, in South Malaya, is the great exception. This was a sultanate of the islands, at one time including the Riouw Archipelago, parts of East Sumatra and of West Borneo. To that old political unit, South Malaya was a barren boundary zone. British and Dutch expansion, however, in the last century split this sultanate, forcing part of it to depend entirely on the peninsular section which had previously been of negligible importance to the sultanate.

British penetration into Malaya gradually led to the expansion of each sultanate to include parts of jungle over which the sultans had not previously been able, willing or interested enough to enforce suzerainty. From the T-shaped pattern of settlements, the sultanates came to include the whole of the principal river-basins as far as the watersheds, which thus became the sultanate boundaries. The British aim to rule indirectly through the sultans, part of that reluctance to accept responsibility which characterized our approach to Malaya during the last century, has resulted in artificially preserving the political form of the sultanates as well as their geographical shape as river-basins, enabling them to resist modifications which might have come naturally when modern developments led miners and planters to attack rather than to avoid the jungle which bounded them.

Upon these Malay sultanates, the coming of Europeans three centuries ago had made little impression. The Portuguese trading station at Malacca, the Dutch station which followed it and the later British stations at Penang and Singapore, failed to cause any major political changes. Far more instrumental in changing the face of Malaya was the penetration into the country of Chinese tin miners which reached a peak in about 1860. Malays had shown no interest in the tin which lay around them, largely because the tin areas were not where they had settled to any extent. Chinese mining enterprise entirely changed the pattern of life over large areas of Malaya and introduced methods of dealing with the surface which were quite foreign to the country.

Most Malayan tin derives from lodes where granite comes into contact with other rocks. The ore has been washed from the lodes among the mountains and deposited in alluvial beds which lie roughly parallel to each other on either side of those mountains arranged



Malayan Information Agency

Beside the lagoons and rivers, the Malays build their villages, shading them with palms and festooning them with drying nets. At midday Malays disappear from the landscape, retiring to the shade

north to south through most of the Peninsula. Broadly speaking, Malaya consists of the jungle-covered and unpopulated Central Ranges, flanked by foothills, then by a badly drained belt of marshy jungle, and this in turn by the healthier coastal strip where rice and coconuts are cultivated and fishing is a major interest. The Malay settlements ran inland at right angles to this pattern, following the main river lines. But the alluvial tin was in the foothill belt, once reached along the rivers which were the only ways through the coastal marshes. Taiping and Kuala Lumpur, at the northern and southern ends of the western foothill belt, were the foci of the earliest Chinese mining activity in the last century. Miners moved in to those districts, with the consent of the sultans along whose rivers they had to travel, but they went into

parts of inner Malaya where the sultans had little influence and where land was virgin. The miners opened primary jungle where no Malays lived.

That the early mining areas were notoriously undisciplined and riotous was not due to resentment by Malays at the intrusion of foreign miners, who lived apart from them, geographically and socially. Disorder followed the 'tin rushes' to Taiping and Kuala Lumpur for much the same reason that gold rushes have produced disorder in other parts of the world—disputes among rival groups of miners. These disputes were aggravated here by the habit of Malay chiefs of granting concessions which overlapped and infringed previous ones and even of granting such concessions in territories over which they had no real jurisdiction. Not until later did

British intervention formalize the limits of each Malay chief, a precision of political thinking foreign to the sultans.

The tin mining by Chinese produced no effects on Malay agriculture. It did not to any extent displace Malay farmers and it failed to stimulate the Malay production of rice, which was staple food for the Chinese as well as for the Malays. The miners were foreigners, they caused rice to be brought in for them from abroad and they exported the tin to foreign markets. From the point of view of the local people, this new and self-contained activity which was going on in the jungle affected them as little as though it were going on in Timbuctoo. The advent of this money-based economy, centering on mining and later on rubber, finally introduced money into rural Malaya, accompanied by the development of a system of shops and middlemen into which the Chinese quietly fitted, partly by their experience as 'the pedlars of the Far East' and partly by the pioneer necessity of doing everything for themselves because the Malays were just not interested.

The Malay sultans who alone, had they been willing, could have organized jungle clearing, initiated drainage systems and helped Malay peasants to benefit from the greatly expanding market developing within the country, were indifferent. They pocketed their royalties from the mines and only stirred themselves to dispute with one another the right to make further concessions in areas where no sultans had exercised political control before.

Britain intervened on the riotous mainland in 1874. Whatever its objective may have been, this intervention produced order and administration, leading to an intensified tin rush by Chinese and a spread of tin mining through the whole interior belt from Kuala Lumpur north through Kinta to Taiping. In this belt a north-south railway was built to serve the mining zone, resulting in a line some forty miles inland down the whole west coast, followed later by a parallel line in the belt of development among the foothills just east of the Central Range. These railways were built by the British administration for the miners and were completely paid for by

Paul Popper



Rubber plantation labour in Malaya is mostly Indian. Every effort is being made to encourage Malays to enter the industry. The worker here shown is a Malay: he is pulling the dried sap or latex from the bark of a rubber tree in a long shred

(Opposite) The Chinese toil in the slush of Malayan tin mines, a job they have made very much their own. Miners are generally newcomers who are fortified against physical discomfort, being upheld by the ambition to return wealthy to South China



Pictorial Press

mining within a few years. Thus was fixed an entirely new pattern, a north-south belt of intense mining activity, densely peopled with Chinese and knit together by modern lines of communication. This belt lay athwart the sultanates which ran inland on east-west lines.

From the end of the 19th century, the belt attracted yet another new economic development. That foothill zone where the tin alluvials lay was also the best-drained part of the country and one well suited to rubber planting, which soon extended in a broad swath from just opposite Penang down to Malacca, using the railway as its artery, and adding yet another foreign economy to Western Malaya. Rubber planting was at first mainly a British development, run by Indian labour and organized exclusively for export. Although this was an agricultural development, it was pioneering in the sense that areas never used by Malays were by this means brought into cultivation.

It is important to note that the rubber zone coincided with the original tin belt and a similar parallelism developed later in other parts of Malaya. Neither of them displaced the Malays. It was an economic disadvantage to the miners and planters that they were unable to persuade Malays to do the work involved or to learn the various trades connected with these innovations. We must not, however, reproach the Malay peasant for being sensible enough not to leave his quiet ricefields, his pleasant home and fruit trees,

to do the undignified and unpleasant work in mines, and not to give up his social life by going to the solitudes of the rubber plantations.

The belts of modern development formed an imposed economic system whose lines crossed those of the Malay sultanates and rendered obsolete their form, however suited it may have been to the self-sufficient isolation of the period when the jungle was feared rather than cleared.

Possibly the British committed themselves to the policy of indirect rule before they realized that the Malay sultanates were embryonic and more suited to evolution than to fossilization; and it is difficult to avoid asking whether that policy did not perpetuate the political structure and boundaries of the sultanates in a form which was an accident of the personalities at the time when we first entered Malaya rather than a mature expression of nationality or a sense of local unity. Are the sultanates outmoded in Malaya? Has the economic development of the country broken down the divisions and stratifications which existed in 1874? Have we a lesson to learn from the fact that across the seas from Malaya, the great political upheaval among the Javanese, blood brothers of the Malays, has taken place under leaders who have by-passed the sultans of Java? May it not be a mistake to suppose that the sultans of Malaya are any more representative of the people in whose name they say they speak? For better or worse, the new eco-



Malayan Information Service

(Above) *A Malay coronation: taken during the lustration ceremony of H.H. the Sultan of Selangor. On such dignified occasions, the Malays revert to their traditional turban-like Moslem headdress. (Opposite) Kuala Lumpur, capital of Peninsular Malaya, is a modern, well-laid-out city of nearly half a million people. With the Chinese as its main community, it is the centre of one of the original tin and rubber districts and retains the atmosphere of wealth and successful pioneering*

nomie forces and problems cannot be held back indefinitely from assuming the forms inherent in them and in the Malayan circumstances. Before letting their romantic titles mislead us, we must ask ourselves whether we have not preserved the sultans as expensive anachronisms without the virtues of constitutional monarchs. We should not be misled by noisy protests. There are bound to be cries at the birth of a nation.

The rôles of the different ethnic groups in Malaya have changed considerably over the last seventy years. In the middle of the 19th century, the Chinese monopolized tin mining both as entrepreneurs and as labourers, but there was no political objective behind their penetration into the Peninsula. There was no home government pressure behind them. They had only one asset—a willingness to pioneer under the difficulties of the Malayan setting. Only the Chinese had the original initiative, organization and labour to run the mines, and no other community has so far rivalled them as mine labourers. In course

of time, the financing and managing of the mines ceased to be exclusively Chinese. In 1874 no European had any share in Malayan tin mining. By 1910, 22 per cent of Malayan tin output came from mines owned and managed by Europeans using Chinese labour. In 1927, the proportion became 68 per cent European, and slowly increased up to 1941, when Chinese formed nearly 90 per cent of the labour force on the mines. This change was not one of buying out by Europeans but developed from an intensive opening-up of new areas where only elaborate installations made mining profitable. It was a change-over to new techniques in mining which called for more capital than Chinese could—or wished to—expend.

The Chinese were not at first attracted by the rubber industry. They originally wanted a quick speculation, not the long-term proposition of rubber planting which was from the beginning a British undertaking. Backed by financiers, British planters could afford to wait some years for estates to mature, so that

British ownership and management dominated the early rubber industry. Only when some Chinese decided to settle in Malaya did they imitate this British innovation. They entered rubber so slowly that in 1935 Chinese owned only 16 per cent of the rubber areas and the average holding was about 18 acres, as against the average British plantation of 1500 acres. The Chinese were rubber smallholders and up to 1941 showed no great sign of changing the form or proportion of their part in this industry.

Malayan mining has at all times depended on an external labour force of extremely variable volume and location. When the tin alluvials at one point diminished or tin prices dropped, the mines closed and the workers left—they had no other ties to the district. When there was a new strike of tin-bearing

alluvials, labour quickly rushed to that district. Chinese miners moved fluidly between China and Malaya and when they went home during depressions, the tin itself was not jeopardized by remaining untouched in the ground. During periods of catastrophe in China, labour came south to the Malayan mines, irrespective of the degree of prosperity among miners already there.

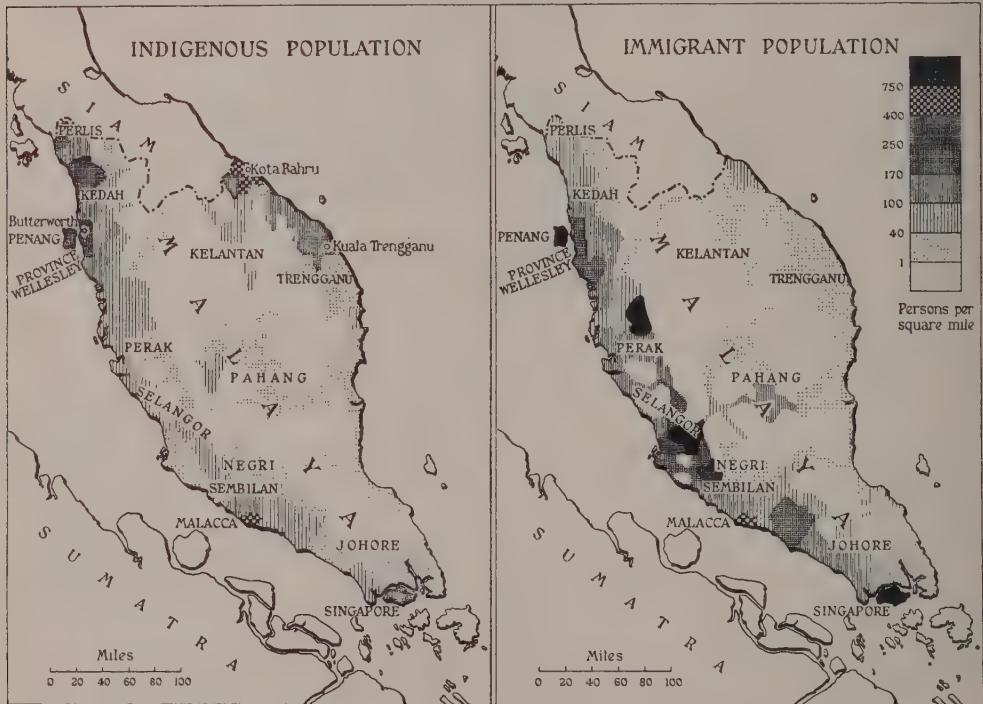
Until the British intervened in the last century, the Chinese mining groups were, in effect, self-governing, independent of their home government, indifferent to the sultans, inflicting summary judgment upon their fellow-men and ignored by the British colonial settlements in Penang, Malacca and Singapore. The traffic in Chinese coolies organized by the Chinese groups was often done with violence, cruelty and trading upon



the ignorant, the sort of thing which has been repeated time and time again in pioneering areas. The regularization which came with the development of British administration boosted the mining industry so that in the decade ending in 1890 more than 120,000 Chinese miners entered the sultanate of Perak alone. In 1901 a quarter of a million Chinese passed through Malayan ports to the expanding industries up-country. Between 1920 and 1941 mining suffered alternations of boom and slump, but the average mining population was some 80,000. These fluctuations threatened the wage standards of all other labour in Malaya and caused great changes in the purchasing power of the community

and in its general commerce.

Although the rubber industry, being a medium-term agricultural development, seemed likely to exert a regularizing effect on Malaya's economic life and to reduce the mobility of its population, in fact it introduced another variable element. Rubber plantations needed a labour force more docile, more suited to the slow routine of plantation work in the tropics, and cheaper than the Chinese. Consequently from 1900 to 1910 nearly a million poor Tamils from Madras were brought into rural Malaya. Half of these returned home in the same decade. While the Tamil coolie traffic was at first handled callously, control of conditions was quickly



Stanford, London

The Malays are very much a rural people. Only three small towns have Malay majorities—Butterworth, Kota Bahru and Kuala Trengganu, all well to the north. In other towns they live on the outer fringes, attracted by the lights though not by the urban life. The greatest densities of Malay people are in the rice-growing estuaries of the extreme north-east (Kelantan and Trengganu), in the rice-growing districts from Province Wellesley north to the Siamese borders of Kedah and Perlis, and, to a smaller extent, along the coast from Malacca to south-west Johore

The Chinese and Indians are mostly contained within a belt about 45 miles broad down the west coast from Province Wellesley to Singapore. In this belt are concentrated 90 per cent of the Chinese and 99 per cent of the Indians, living in nine of the eleven largest Malayan towns, and in the mining and rubber belts described in the article. The Chinese are mainly urban in distribution, the Indians less so because of their work on the rubber plantations. East Malaya has only a few Chinese settlers and very few Indians. Penang and Singapore are largely Chinese settlements



Malayan Information Service

On Singapore's waterfront East meets West and all Asia comes together. Through its harbour passes the shipping of the Pacific and Indian Oceans and its warehouses are emporia for South-East Asia. More cosmopolitan than the rest of Malaya, its 'free port' is to be continued with special status

established, if only from the mercenary idea of safeguarding the future labour supply by making Malaya attractive to free labour from India. But rubber booms and depressions produced a great ebb and flow of Tamils. In some years, over 100,000 Tamils were repatriated to India, to be brought to Malaya again in equally large numbers a few years later. These fluctuations in an agricultural labour force were without comparison elsewhere and remarkable because the rubber tree is non-seasonal, a regular producer throughout the year and tends to produce regular employment. The irregularity of Tamil labour was due to the economic machine, not to the planters or the workers.

Since the rubber estate population was, in the period between the wars, of the order 600,000 as against some 80,000 in the tin mines, it is evident that the variations in Malaya's economic life caused by the rubber industry have had effects more profound than those of the tin industry. In proportion to the whole, this meant that one-fifth of the population of Malaya was foreign, engaged in primary production widely varying in its demand upon labour, and without other means of support within the country. This was a fact of the greatest significance in Malaya's political geography. Of this labour corps, Chinese formed about a third and Tamils the rest; all other Malayan activities were geared to it. Though there are examples of other countries where internal conditions

are highly geared to variations in a few circumstances, none other is like Malaya in having a population of migrants who went in and out of the country fluidly in response to external economic and political conditions but without any connection with the policy of their home governments.

The degree of the population movement has been rapidly changing. Only 8 per cent of Chinese in Malaya at the time of the 1911 census were locally born. By 1921 the proportion was 17 per cent and by 1931 (the last census) nearly 30 per cent. The proportions for Indians were always less, and in 1931 only 21 per cent of Malayan Indians were locally born. There was an increasing tendency to settle and establish families in Malaya where the immigrants could obtain a better livelihood than was available in their homeland. They were *dépayés*; they had no reason to return to China or India, they had lost their ties in those places and yet were not citizens of the territory where they lived.

It is convenient to assess the numerical strength of the Malayan communities today. The total population increased from 3·3 millions to 5·5 millions during the period 1921-41. On present estimates the position in 1941 was that 41 per cent of the population were Malays, about 25 per cent were Malaya-born Chinese and Indians, and about 33 per cent were immigrant Chinese and Indians. Whether these immigrants were also transient cannot be stated with any

accuracy, but it is significant that no migratory move to China and India has become apparent since the end of the war with Japan.

Desirable though this settling-down was, from the point of view of stability in Malaya, it raised serious questions of nationality and loyalty as India and China developed an emotional atmosphere of intense nationalism. Could communities of Chinese and Indians resident and born in Malaya and by modern standards nationals of Malaya, stand on equal terms with Malays? Was it possible to maintain internal accord between these ethnic groups which differed so much in character, religion, receptivity, tradition and political sense? That was the problem which an increasing competition for work and opportunity was bringing to the forefront as Malaya filled up and the Far Eastern war drew near.

It was the more acute because the communities had special geographical distribution which to a large extent kept them apart spatially, as shown on the maps on page 148.

During the Japanese occupation, the rivalries inherent in this ethnic, economic and political complex were exacerbated. The paralysis of the rubber and tin industries during that period increased the communal rivalry and the virtual cessation of movement by sea prevented Indians and Chinese from going back to India and China as they had done in previous economic crises. For the first time in many years, the Malays found that their subsistence agriculture kept them comfortably fed at a time when all other producers were desperate even for the simplest foods. Although the Japanese provoked the Malays and Indians to abuse the Chinese, they did not conciliate any one community, because they allowed Siam to annex the only exclusively Malay-peopled sultanates of the north and drafted the Tamils as labour gangs to all parts of South-East Asia. We have been left with an appalling legacy of communal distrust. The Malays and Indians allowed themselves to be involved in pogroms against the Chinese. The Malayan Chinese saw realized their worst fears—that they would be hounded in South-East Asia, as the Jews were in Europe. The Malays have feared that foreigners in the Peninsula would soon squeeze them into the jungles, as the Americans have squeezed Red Indians into the reservations. It cannot take less than a generation to heal these wounds in the communal spirit.

The Malay community is one with considerable coherence, and though it lacked political consciousness in the past, it may follow the lead of the Javanese. It has begun to develop rural cooperatives to defend itself

from the evils of middlemen. On the other hand, the Chinese community is deeply split within itself. There is the split between the locally born and the new immigrants. These in turn are divided in sympathy between the Kuomintang and the Communists (of Yenán rather than Moscow), between the newly aroused trade union movements of the towns, and between the old 'secret society' groupings of the mining areas and the Chinese rural small-holder who has found the British administration sensitive to his interests in its desire to stabilize the Chinese community by giving it firm roots in long-term activities. No wonder we have had considerable criticism of the Malay Union by spokesmen on behalf of the Malays and few on behalf of the Chinese. What has happened to the Indian community is not yet quite clear; it has been forcibly dispersed in all directions, but it is significant of their interest in Malaya that only 15,000 Malayan Indians have accepted our recent offer of repatriation to India.

Such a medley of ethnic and economic variety in Malaya may well confuse those who look at its details for the first time. The pattern might be much simplified by new administrative units within the Peninsula, drawn more in accord with contemporary economic and geographical influences than are the sultanates. It might be possible to create three units—North Malaya, East Malaya and West Malaya, with reasonable ethnic and economic homogeneity. In any case we may keep our sense of proportion by reminding ourselves that the total Malayan population is not much more than half that of London, scattered in an under-developed area about equal to the United Kingdom.

These then are the elements to be synthesized. The Malayan Union may be unique in the complexities of its elements but these merely control the approach, they should not prejudice us regarding the results. Other states and nations have been welded into coherence from equally unpromising beginnings. To stabilize the country by moulding it into a nation and its peoples into citizens implies ultimately a plan to even out the economic vagaries of the rubber and tin industries, regularizing the labour situation and impeding the entry of those who wish to gypsy in Malaya for a few years. The conception, however, implies a political synthesis and state-planning which call for the ablest British pioneers, flexible in their thinking, broad in their humanity and not erring in favouring any one community or in treating the warm-hearted Malaysans coldly as pawns. Above all it calls for a sense of human geography.

Airman's Britain. I

by MARY DE BUNSEN



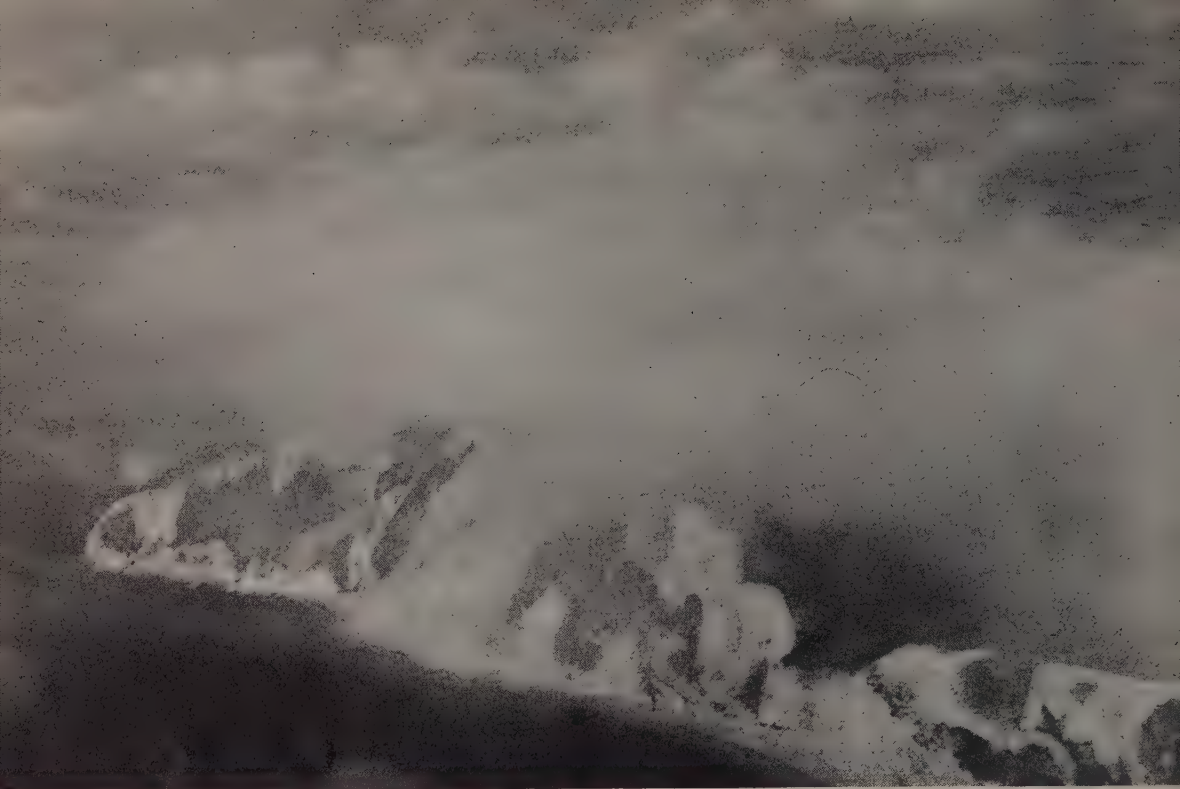
Aero Pictoria

In the mind's eye, we see England in a series of disconnected pictures. We know some of its details intimately, but only those of us who fly have seen it whole. And by flying I do not mean the flight of the heavy bomber or the transcontinental airliner, guided by science in a straight line to its destination, often out of sight of the ground. I mean the comparative pottering of the man who flies himself about in a light aeroplane, and his war-time equivalent the ferry pilot, navigating among the irregularities of Britain's surface and the vagaries of her weather by what is known as 'contact flying'—which means the map, the compass and his five wits.

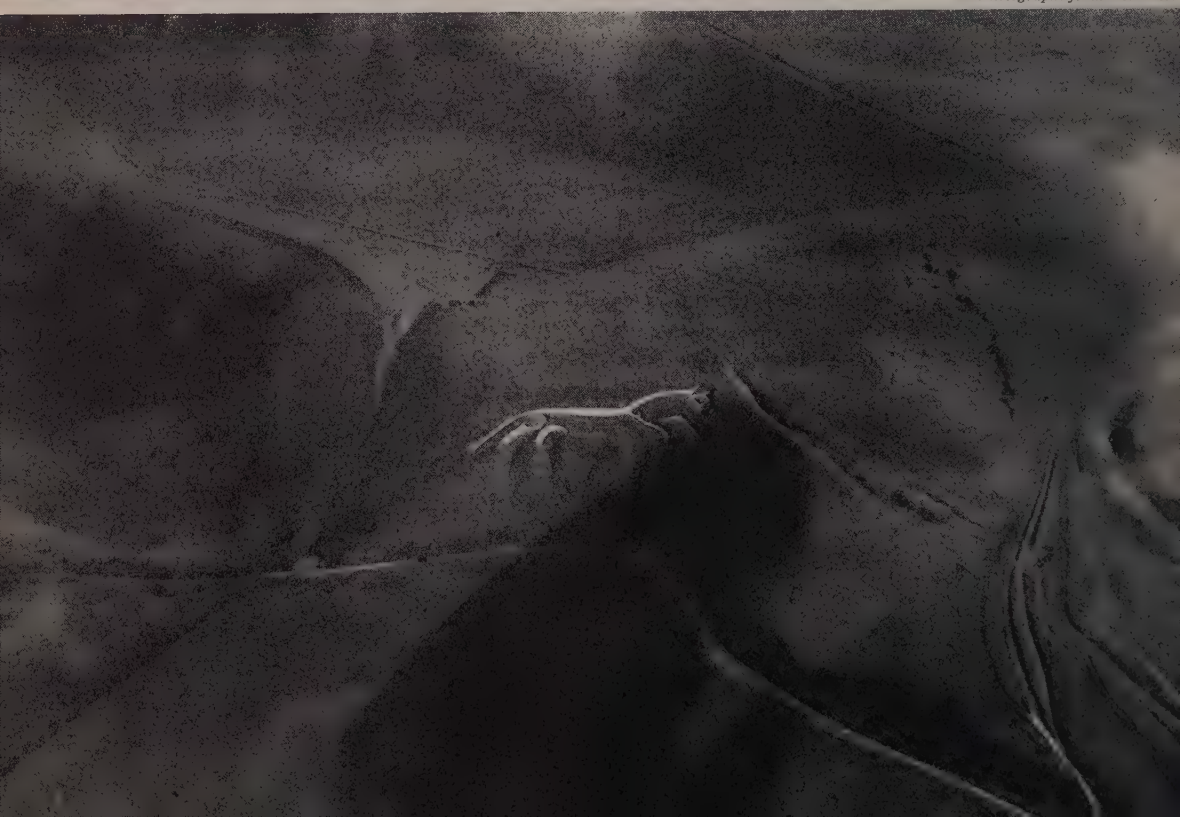
To this end, flying as a passenger is only a half-measure. To attain the full freedom of the air, you must pilot yourself, preferably alone, so that you can indulge every whim of flight and turn aside to investigate anything that attracts you. It is also necessary to be experienced enough for the mechanical details not to loom too large in the foreground. It took me twelve years to attain this happy

state, for the first ten of which I could not afford to do enough flying to get past the barrier of inexperience. The war turned me into a ferry pilot, and after a further two years' preoccupation with the progressive mastering of about sixty types of aeroplanes and their safe delivery, I entered into my inheritance.

England began to take shape, and ranges of hills to assume their proper geographical relation. I served my apprenticeship in the little hills of the south; the chalk cliffs, sucking up the fog to a flyable height as it drifts in from the sea; the Berkshire Downs, dominating the wide and comfortable Vale of White Horse; the Chilterns with their north-west face a sure landmark and guide into the Thames Valley for the south-bound pilot who for the last half-hour has forgotten to attend to navigational details; the Cotswolds, first seen and loved from the air, with Little Rissington aerodrome of many memories emerging from its blanket of lifted fog; Dartmoor and Exmoor, crossed in a matter of minutes, yet disproportionately



Photographs from Aero Pict



forbidding. Then I was moved up north to sterner stuff. A half-forgotten sentence from a geography book, "The Pennines are the backbone of England", suddenly came alive. Often enough, our destination lay on the other side of them, giving full scope for skill, an eye for country, recklessness or low cunning, all in a friendly spirit of competition sternly discouraged on paper but in practice condoned for its incitement to hard work.

There are several ways of getting across the Pennines, but only one way of getting round them, and that is to fly south and pick up the Trent and follow it round by Nottingham and Derby. This is a real old woman's route, though quite confusing at its western end. To cross the Pennines you can, of course, fly over the top of the cloud or haze if there is a reasonable certainty of finding it clear the other side. But you risk engine failure and a crash landing in the thousands of square miles of deserted moor and mountain which are hardly realized by those who live in the overcrowded plains. More probably you will try the gaps—the days on which you can fly straight over the hills in good visibility at two or three thousand feet being rare enough. The relativity of heights, to the airman flying 'contact' without recourse to instruments and radio, is sometimes puzzling to the layman. The Tyne Gap or the Skipton Gap may be understood to have some kinship with mountain passes, for at least they run through mountains of a sort. But it is difficult to explain that even the Reading Gap, where the Thames flows mildly through a narrow valley between the Chilterns and the Berkshire Downs, can be quite exciting if the clouds are low and the situation is complicated by the smoke from local factories.

Perhaps we would be crossing the hills from Yorkshire to Carlisle in shifty weather, and one would begin by trying the straightforward route up the Great North Road to Catterick, turning left, as the motorists do, at Scotch Corner and flying west through the Barnard Castle Gap (which, oddly enough, leads along with the Roman road by Bowes and Brough and not through Barnard Castle). You need 2000 feet, of height to get comfortably through that gap, and perhaps it was closed, except for a deceptive

gleam just above the roadway, beckoning you on into the Eden valley, where several pilots have been 'envalleyed' (or whatever is the aeronautical equivalent of the mariner's term 'embayed'—the sensation is very similar) by bad weather coming in from the Solway Firth. So you probably thought better of it and flew north to the Tyne and turned westwards through the Tyne Gap. This is narrow in places and you need about 1500 feet to get through comfortably, but there are useful aerodromes at each end. If the weather had clamped down on the Tyne, and you had petrol and persistence, you could retrace your steps to Leeds and try the smoky, winding Skipton Gap, past "Ilkla' moor ba'at 'at". This gap is an exercise in map reading, especially at its western end, where hills crop up like bunkers in your path. But if you were lucky, you got through and rounded Ingleborough and went up over Shap or round the coast by St Bee's Head. This jolly sequence of alternatives was only possible in a fast aeroplane; in a slow one it would take too long, but I quote it as an illustration of the possibilities of flying. Perhaps you didn't make it at all. I remember the rather pregnant atmosphere in 'Operations' when I returned to base at the end of the day with the same Wellington, having tried two gaps in the morning, lunched at an aerodrome near Catterick, tried the same two gaps in the afternoon and consumed about 140 gallons of petrol without getting anywhere.

English weather contains a large enough element of frustration to make memorable the days when you can cover a long distance in an absolutely straight line. Such was the occasion when I flew an Anson from the Moray Firth to the Bristol Channel—500 miles in three hours—almost straight down a meridian and with a rollicking tail wind. I had brought a Beaufighter up from Yorkshire in the morning, leaving our base at 11 A.M. Last landing time in the south was 5 P.M., so I did not stop for lunch, but took the Anson off from Lossiemouth and settled down to fly south as I ate my sandwiches. It was real north-westerly weather, of the kind that follows a cold front. There was a strong wind, occasional perambulating rainstorms with towers of cumulo-nimbus cloud, follow-

Fog, drifting in with the sea breeze, is lifted by contact with the warmer land surface and by the up-current caused as it meets the chalk cliffs and south slopes of the Downs. Inland, it will gradually disperse, or form low stratus cloud. A trace of this lingers in the lower picture, which shows the ancient, yet queerly futuristic White Horse of Uffington high above the Vale

ing each other across the country, and in between, bright sun, dramatic contrasts on sea and sky and mountain, cloud shadows giving life and movement to the countryside, and visibility limited only by the curvature of the earth's surface. Skirting the Cairngorms, I crossed the Forth to North Berwick Law and settled down on about Longitude 2 degrees 40, which took me right down the length of England. Nothing feels so satisfactory as flying straight down a meridian. Crossing the Border hills to Penrith, I continued over Shap to Preston, through a cross-section of the Black Country, which, to the airman, has its own smoke-veiled, illuminated beauty if the atmospheric conditions are right. The Wrekin, making the most of its 1335 feet, stood very forbidding against a great storm in the Severn Valley, to avoid which I made a half-circle westwards. I crossed the soft hills of Herefordshire, the Wye Valley and the Bristol Channel to Weston-super-Mare, where I arrived in the winter evening sunlight, with a quarter of an hour to last landing time and about an hour's petrol in hand, to consume a grilled herring with a sense of utter fulfilment.

The days when low cloud inland forces you to follow the coastline, sometimes below the level of the cliffs, are fun in themselves. A sequence of photographs accompanying this article gives an idea of the variety and interest of one such route. It runs out of Yorkshire northwards around the Border into Scotland. Bamburgh Castle, with the rocky, bird-haunted Farne Islands just across the way, and the desolate, sandy shore of Northumberland lead, past the mouth of the Tweed, to the commanding heights of St Abb's Head. The Bass Rock dominates the Firth of Forth, its precipices plastered with seabirds long inured to tripper

steamers and low-flying aeroplanes; and its landlocked twin, North Berwick Law, is almost as conspicuous. The Tay is chiefly remarkable for a sandbank at its mouth on which about a hundred seals bask at low tide, apparently unaware that they are the central attraction of some sort of practice bombing range. And so you continue by the great Montrose basin, past Stonehaven to Aberdeen and Peterhead, while fishing boats thrash along beneath you, taking a tossing which emphasizes the relative smoothness of flight.

To all this I must add that the vaunted freedom of the air is complicated by the fact that practically the whole of the British coastline is taken up by one sort of prohibited area or another. Nevertheless, to fly along the coast is often the safest—if not the only—way of getting anywhere by air in bad weather, and now that Peace renders many restrictions unnecessary, it is up to airmen themselves to



Even smoke has its daily rhythm, and in still weather local visibility will improve as the morning mist clears and then drop perceptibly about 11 a.m. as domestic fires and factory furnaces get going



Murky weather in the high Pennines and Cheviots may sometimes force the northbound airman to seek safety by flying along the desolate, sandy shore of Northumberland—



—past such landmarks as Bamburgh Castle, which he sees from an unaccustomed angle with 12th-century tower and keep exposed in fresh detail to his 20th-century view—



—and round (since he may well be flying below the level of the cliffs) the rocky bastion of St Abb's Head, a formidable barrier when cloud caps the heights inland



J. D. H. Radford

On this coastal route, as the Firth of Forth opens in varied outline before him, the airman's eye is caught by North Berwick Law (above) and its geological relatives Traprain Law and the Bass Rock

fight for the return of their freedom. Needless to say, it is also up to those of us who can still afford to fly to see that we do not prejudice our future by behaving like hooligans. I know from experience that birds and seals get as accustomed to aeroplanes as cattle do to passing trains, and I do not think that the occasional lone aircraft on its lawful occasions need disturb anybody's contemplation or repose. Rather, it can arouse the most romantic and pleasurable speculations, as does a passing ship.

The airman's thoughts, if he is of an open and contemplative mind, are conditioned by the terrain over which he is passing, and by the height at which he flies. Any seagoing man is familiar with the sense of growing detachment as the coast recedes into the distance, and with the sudden casting-off of mental chains when he loses sight of land. Much the same thing happens in flying as you gain height. The low-flying airman is still

of the earth, though not on it. He is reminded of the routine of daily life. Here, in a thousand suburban back-gardens, strings of washing hung out to dry proclaim that it is Monday morning. There (horrible practice, though almost unavoidable with the present labour shortage) they are burning straw instead of composting it with animal residues and ploughing it back into the land where it belongs. Here is evidence of some farmer's ill-luck—a local hailstorm has flattened half his crops; there a river has overflowed its banks, changing, for the time being, the whole aspect of a section of country. Along the Great North Road, motor cars and lorries thrust and thread their way in endless competition, and are as beetles both in their appearance and in their cosmic significance: no more important, and no less.

Incidents stand out—trivial, like the impasse which occurs when a lorry meets a travelling circus in a narrow lane; disastrous,



J. D. H. Radford

From the airman's viewpoint "man is judged, not at his own valuation, but ecologically, as part of a universe which is greater than himself". In the texture of that universe, the tracery of foam around a stranded ship off the Scottish coast is brought by swift movement into contrast with (opposite) the deep gullies and delicate veins scored by erosion upon the face of Ben Nevis

like the stranding of a ship; or tragic, as when a tell-tale column of black smoke betrays the funeral pyre of some airman who has paid the penalty of somebody's mistake, perhaps his own. The whole pattern of man's life is exhibited, and the changes that he has wrought upon the earth may be surveyed and evaluated as you pass in flight over the high, untouched moorlands and down to the various levels of cultivation and industry. From this viewpoint man is judged, not at his own valuation, but ecologically, as part of a universe which is greater than himself. The sprawling cemeteries which share with aerodromes, in ghoulish but occasionally apt proximity, the open spaces in the suburbs of large towns, bespeak the end of individual threads of life. The surrounding pattern is of a finer texture: the immeasurably gradual weathering and erosion of an exposed mountain face; the evanescent tracery of foam; the ridge and furrow on land and sea alike, the one static, the other fluid, one the evidence of human striving for a foothold on earth and a continuing home, and the other symbolic of man's failure to master the forces

of nature and shape them to suit his own convenience.

Beauty to the earthbound observer is an intimate appreciation of delicate detail; seen from the air, it consists of line and colour on a very large scale. The curious patterns of afforestation, the design scooped out in sand at low water in an estuary, the dramatic white slash across blue sea made by the wake of an air-sea-rescue launch, the full extent and impressiveness of a great water-front of which a pedestrian view reveals only squalor and stench, all these are part of that other dimension which shapes the airman's wholeness of view—if, indeed, he has ever taken note of it. But it is doubtful whether one airman in a hundred sees more beneath him than a great map with no names on it, wholly or partly veiled in cloud, haze and industrial smoke; a relief map alive with hazards of which he is very well aware—hills, chimneys, wireless masts, electric cables and, even now, the occasional captive balloon. It is curious how many airmen are unable to put a name to some of the landmarks which they best remember.

(To be continued)



J. D. H. Radford



Kodachrome by D. Turpin

The Anatomy of Landscape

by PROFESSOR E. G. R. TAYLOR

Professor Taylor needs no introduction to readers of this Magazine. With the present article she initiates a short series designed to show, first, how we may learn to detect the underlying features that give the clue to a landscape's history; next, what natural influences weave and transform the varying mantle with which the soil, covering earth's rocky skeleton, is clothed; and, finally, the relationship between man's activity and the landscape as it appears in many places today

"BUT what's underneath?" persisted the little boy, walking for the first time along the beach, "what's underneath?" "Don't ask such silly questions," said the grown-ups, busy talking. "At school," replied the little boy apologetically, with visions of the sand-modelling pile, "At school there's linoleum underneath!" How many of us in point of fact could solve his conundrum? So far as the sea-sand and shingle are concerned, perhaps, the answer is not difficult. It is fairly obvious that beach material is a mere superficial deposit which the waves and currents now pile up, now sweep away, hiding or exposing the bare ribs of rock or beds of slippery clay. Only the groynes and breakwaters, or perhaps some jutting headland, serve to keep it in place.

But what lies beneath the rocks in their turn (for to the geologist clay is also a rock)? So far as the common rocks of south-east Britain are concerned (and similar rocks occur

widely the world over)—the white chalk of the Downs and Dover cliffs, the bright red sandstones of the Midlands, the coral limestones of the Cotswolds, the sticky clays, too, of Essex and Hertfordshire that caused such an outcry against our roads before Telford's day, all these so-called sedimentary rocks are also merely superficial. Layer upon layer they rest one on the other, but their total thickness of three or four miles is a mere bagatelle when we remember the four-thousand-mile distance to the centre of the earth. Beneath them lies the true 'crust', the so-called basement complex, composed of granite and granitic rocks, gradually merging into basalts beneath the ocean beds, but providing a continuous carapace to the globe, and over vast areas (as in Finland and round Hudson's Bay) actually exposed at the surface. The thickness of this basement is of the order of twenty to thirty miles—no more than a stout skin—and beneath it lies the undercrust, comprising



Kodachrome by F. Fisher

(Opposite) Surf breaks on the wave-worn platform (covered with golden sand) at the foot of these Cornish cliffs near Newquay. The level skyline marks a marine platform of a past age now high above the sea. (Above) Weathering-out of joints in the rocks detaches these giant monoliths in Monument Valley, Arizona. In the dry air their sharp outlines are preserved



Kodachrome by F. Fisher

The Little Colorado River has cut this deep horse-shoe gorge into ancient marine sediments which still lie horizontally. Cornice and ledge mean hard and soft layers respectively



Dufaycolor by D. A. Spencer



Dufaycolor by R. C. McWalter

The Mer de Glace, Chamonix (above) is a glacier which half fills a high Alpine valley. Such glaciers once wound their way right into France, Bavaria and Italy. The valley in the opposite picture once held a glacier which filled it to the level of the 'shoulders' where the slope changes

Frost-shattered pinnacles and moraine-dammed lakes are well illustrated in the Valley of Glaciers, Kashmir (left), which also shows the snow that feeds the glacier



Kodachrome by D. McMaster

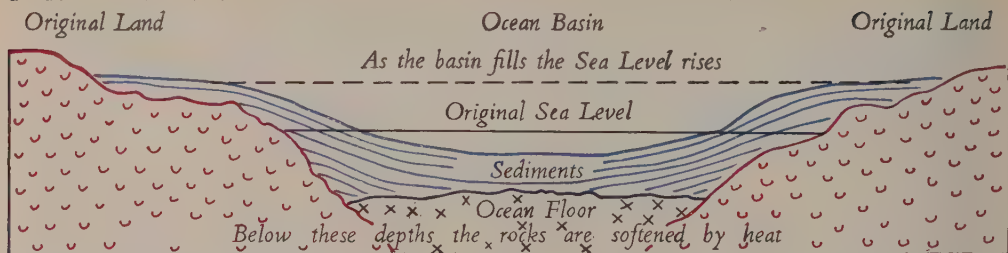
still heavier materials and with a temperature so high that it is sufficiently plastic to yield to long-continued stresses.

That Mount Everest is five miles high every schoolboy knows, and perhaps he learns of lofty plateaus in Central Asia and Peru that are three miles or more above sea-level. But these figures, he thinks, are just "one of those things". Actually they are nothing of the sort. Loftier mountains and more elevated plateaus are out of the question, for so soon as they are formed their weight crushes the crust down into the weak undercrust just as a laden ship sinks more deeply into the water. Such a sinking will cause a bulge elsewhere, and so the contrasts of heights and depths on the earth's surface are kept within certain bounds. The reverse process of recovery as load is removed also takes place. In the case of mountains and plateaus since in the course of nature they are gradually weathered and eroded away, and their débris carried seawards, they are gently lifted from beneath until ultimately even their very roots may be exposed! Such an elastic working of the crust would perhaps be hard to believe had we not clear-cut evidence of it engraved upon the mountainsides of Scotland, Scandinavia, north-east Canada and elsewhere. In north-west Europe and in North America some hundreds of thousands of years ago such

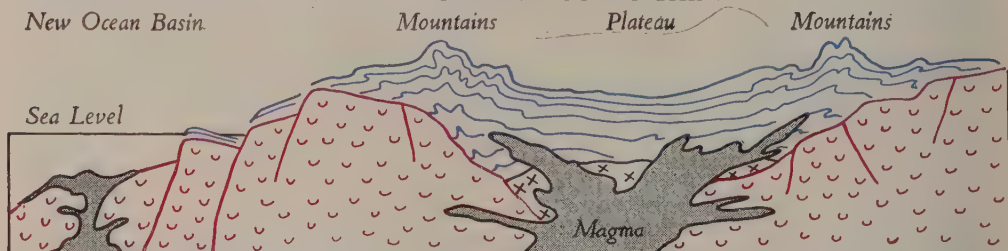
an enormous thickness of ice accumulated as pressed the crust down in the way described. Cliffs and beaches were then cut by the waves, and these easily recognizable shore-lines, now that the ice has gone, have been lifted up scores and even hundreds of feet above present sea-level. Many a Scottish croft is perched upon the conveniently flat surface of such a raised strand. But the story is complicated by the fact that the volume of melt-water from the ice-sheets was sufficient appreciably to deepen the oceans, so that low-lands were invaded. Indeed this locking-up and releasing of water may hold the key to one of the big puzzles of the anatomy of landscape, the growth of coral islands from bases at such a depth that the coral polyp could not live there!

So recent an event as the Great Ice Age, however (for it was contemporaneous with that late-comer Paleolithic Man), can only account for detailed surface modelling, mainly of parts of the continents in high latitudes, although it is true that certain of these details form an important link in the chain of events which led to two world wars. However that may be, the grand lines of our scenery are very much older than mankind, and have been developed from within the crust, not imposed upon it from without. During the earth's lifetime as a globe, which must be

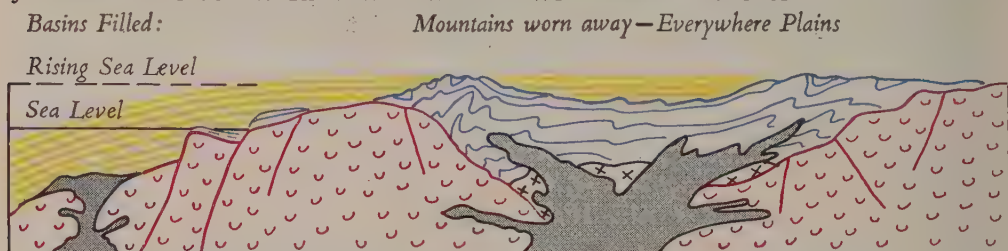
1. THE FIRST LANDS ARE WASHED INTO THE FIRST SEAS



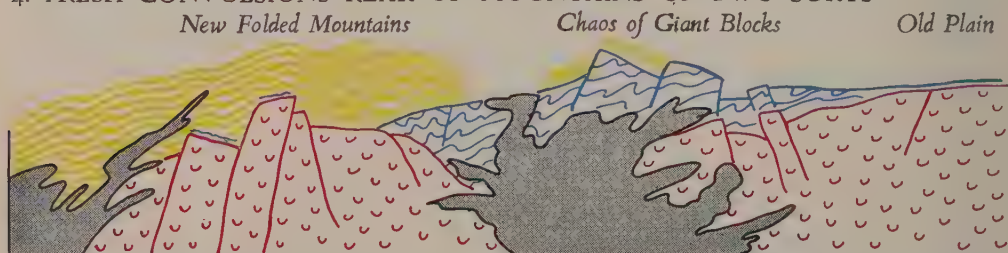
2. THE SEA FLOOR IS HEAVED UP INTO MOUNTAINS



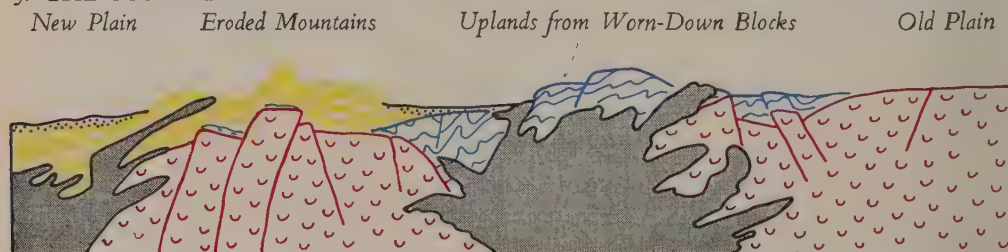
3. THE MOUNTAINS ARE WASHED DOWN INTO THE SEA



4. FRESH CONVULSIONS REAR UP MOUNTAINS OF TWO SORTS



5. THE MOUNTAINS ARE WEARING AWAY. MONOTONY THREATENS



THE CYCLES OF EARTH HISTORY

Stage 1. When once the molten globe was cool enough, a crust of rock formed over it. The waters gathered into the oceans, and rain began to fall. Particle by particle the exposed rocks were washed down to the sea, where beds of sediment accumulated to the thickness of thousands of feet. Slowly the sea-level rose, and the sea advanced on the land. Hundreds of millions of years pass

Stage 2. The interior of the globe has continued to cool and the outer crust is a misfit. It buckles and cracks and in places collapses. The soft sediments, squeezed between two approaching continents, are upfolded fanwise into mountain chains and high plateaus. Molten 'magma' surges up from the depths, dissolving everything in its path

Stage 3. A quiet period supervenes. The new mountains and plateaus are imperceptibly weathered away and their debris deposited as sediment in the seas and oceans. It is Stage 1 all over again. The continents are reduced to featureless plains over which the sea advances. Round the shores are wide fringes of sedimentary plains. Many millions of years elapse

Stage 4. The crust again becomes uneasy, for the globe continues to shrink. Strains and stresses accumulate until at length they must have relief. The soft sediments are squeezed up into folded mountains, while rigid segments of the crust are literally smashed. What is left of the older mountains is broken up into a chaos of giant blocks, some pushed upwards, some collapsing. More molten magma wells up from the depths. It is Stage 2 over again

Stage 5. Violent stages and quiet stages have already alternated six or seven times. The last convulsion gave us new mountains like the Alps and Andes, and so-called 'block mountains' which are upthrust blocks of the crust, like the Highlands of Scotland or the Ardennes. We are half-way through a quiet stage, our mountains and uplands are much weathered but not yet worn away

nearly two thousand million years, it has occurred half a dozen times or more that the gigantic stresses and strains certainly developed (although their causes are in dispute) in the crust have been relieved by the building of vast mountain chains. In these chains the sedimentary rocks are seen to be overfolded as though their extent had been reduced by taking in giant tucks. Each mountain system in turn has been worn down to its roots, save the last, the 'young' mountains of today, the Alps, Andes, Himalayas, Rockies, whose years may be counted in mere tens of millions. Yet even these are undergoing degradation before our eyes, and as the processes which destroy them are various—the frost-shattering, the land-slips, the avalanches, the slow grinding by ice, the smoothing by running water, the sheer chemical dissolution—so there results an infinite variety of forms, of pinnacles and domes, of crests and walls and towers and precipices, of lakes and water-falls and swirling torrents, to delight the eye. Perhaps we should say to delight the modern eye, since to the Christian gentleman of two centuries ago a mountain scene was as horrible as a misshapen cretinous dwarf: both were God's judgment on sinful humanity.

The convulsions that heave up new mountains also play havoc with the worn-down stumps of the old, if these lie near at hand. Shattered into a chaos of giant fractured blocks, some tilted sideways, others submerged, others again almost overturned, their former scenic tameness disappears. The more resistant rocks of which they are composed are now etched out afresh in high relief, while their rejuvenated rivers grave into each surface a delicately articulated pattern of strath and vale, gorge and glen, these to be retooled perchance by glacial action. Such is the origin of the scenery of Scotland and of Wales, of the lovely Rhine gorge, too, below Bingen, although in the Rhineland the squaring and grinding and polishing effected by ice has had no part. As through the ages two neighbouring valleys deepen, so the land between them comes to stand out as a ridge, or perhaps due to the carving also of side valleys is reduced to a series of separate mountains, as has happened in the case of Ben Nevis and Snowdon and Scafell. These are mountains of 'circumdenudation', sculptured from a block.

New folded mountains seem to occur where the waste of their predecessors has accumulated so thickly that it sags the crust down until the underlying basement complex and even the lowest sedimentary layers are melted by the earth's interior heat. A belt of weak-

Over the lip of the Great Falls the Yellowstone River (United States) drops a sheer 308 feet to the boiling rapids below. The gorge has been carved out of rock by the tumbling water. Waterfall and gorge are associated landscape features



Normann

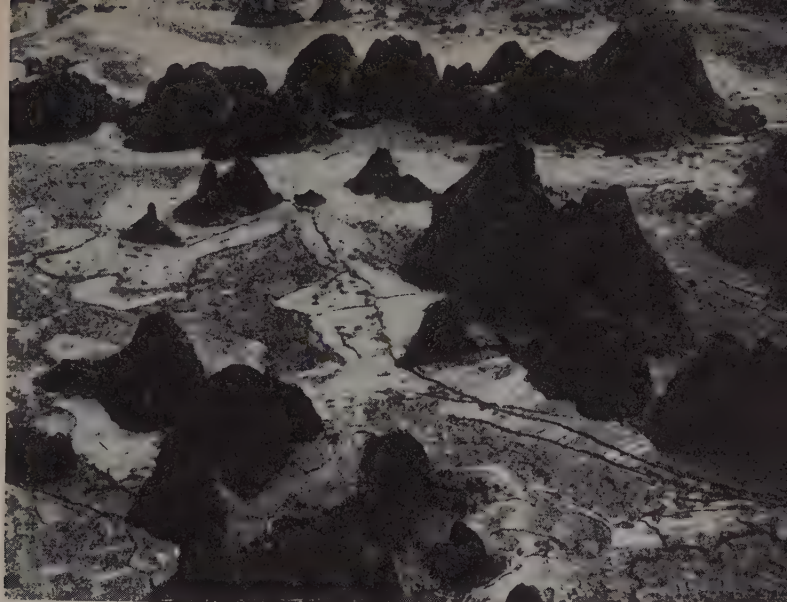


Rolphe Dauphin St Paul

(Left) This still fjord originated as a deep trough-like glen shaped by a glacier, and later flooded and half-filled by the sea. The Scottish sea-lochs have the same origin, but among the loftier Norwegian mountains all features are on a grander scale

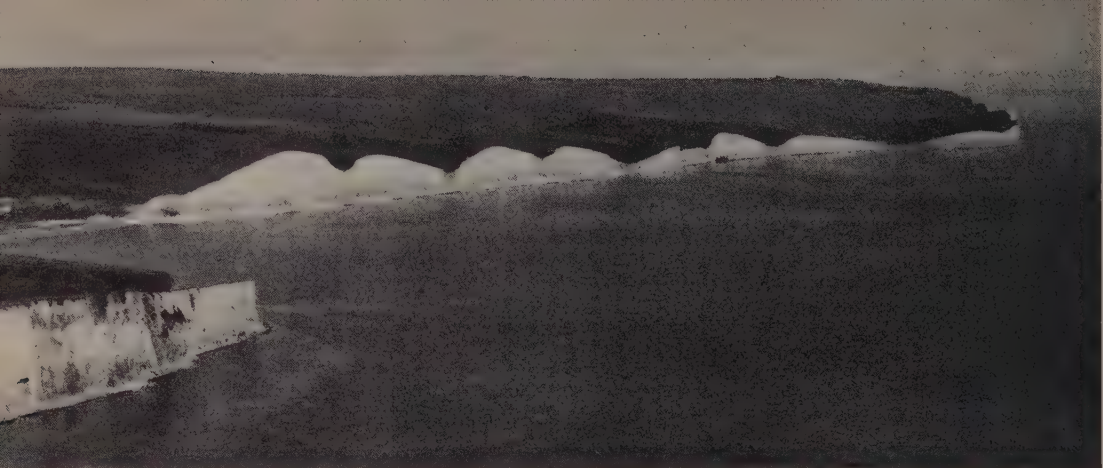
(Opposite) In the Yukon. The two main valleys meeting in the centre of the picture were eroded by monster glaciers, as the slab-like appearance of the valley-sides indicates. The Ice Age has passed. A river is now sweeping away the moraines, and can be seen carving a steep cliff in the foreground on the left

Almost buried under recent sediments, these mountain tops in China contrast sharply with the smooth surface around them. Erosion is uncovering them. In Charnwood Forest similar buried peaks poke through the soft red marls of Leicestershire



From 'Chinaflug' (Atlantis-Verlag)





A. W. Hobart

These are the familiar Seven Sisters. They are formed by the sea truncating seven of the "whale-backed ridges" of the Downs. To the left is the mouth of the flat-floored Cuckmere Valley, once an inlet of the sea, as the now over-grown cliff that can only just be seen on its far side shows. The fine texture and vertical jointing of the chalk account for the nearly perpendicular cliffs

ness is thus created in which crumpling and folding is relatively easy, and it would appear from the case of the Alps which have been minutely studied that the squeezed-up folds overturn along the edges of the more stable masses on either side of them. These masses are then tilted down under the extra load, and the resultant trough, if invaded by the sea, gradually fills up with fresh sediments. The unexciting, if often pleasant, scenery associated with such young sedimentary rocks does but enhance the splendour of the neighbouring mountains, as when we view the High Alps from the Swiss Foreland, or the Himalayas from the Ganges plains. The southern limb of the mountains of Anatolia and Persia has tip-tilted in this way the huge mass of Arabia so that its higher edge overlooks the great fractured gash of the Red Sea, while its lower edge is hidden under the muds of Mesopotamia and the waters of the Persian Gulf. Along this edge, as so often happens in these fold-mountain forelands, there are great stores of mineral oil. The resultant forest of oil-derricks is no aid to beauty, but fortunately such excrescences form no part of the anatomy of landscape and their consideration can be deferred until in another article we turn to Landscapes with Figures.

The repercussions of mountain-building die out gradually with distance, expressing themselves perhaps merely as a gentle up-arching and down-bending of the surface sedimentary layers capping the basement complex. But this is sufficient to create pleasing contrasts of form. In southern and eastern England, for example, and round

Paris, such lightly flexed strata have at some time been bevelled off, with the result that alternate outcrops of weaker and stronger rocks have been exposed at the surface side by side. With the further passage of time the weaker rocks, usually clays, have been opened out into wide vales such as the Vale of Aylesbury, while the more firmly textured chalk, sandstones and limestones have been left standing out as lines of hills—the Chilterns, the Côtes de Meuse. The denuded dome of the Weald is peculiarly lovely, and provoked the old botanist John Ray to counter his contemporaries' conviction that attractive scenery is limited to plains. "And here it may be objected", he wrote in 1693, "that the present Earth looks like a heap of Rubbish and Ruins; and that there are no greater examples of confusion in Nature than Mountains singly or jointly considered. . . . To which I answer, that the present face of the Earth, with all its Mountains and Hills, its Promontories and Rocks, as rude and deformed as they appear, seems to me a very beautiful and pleasant object, and with all that variety of Hills and Valleys, and Inequalities, far more grateful to behold than a perfectly level Country without any rising or protuberancy to terminate the sight. As any one that hath on the one hand seen the Isle of Ely, or any the like Country exactly level, and extending on all sides further than one can know, or that hath been far out to Sea, where nothing is to be seen but Sky and Water: and on the other, from the Downs of Sussex enjoyed the spacious and ravishing prospect of the Country on one hand, and the Sea on the other,



Dorien Leigh

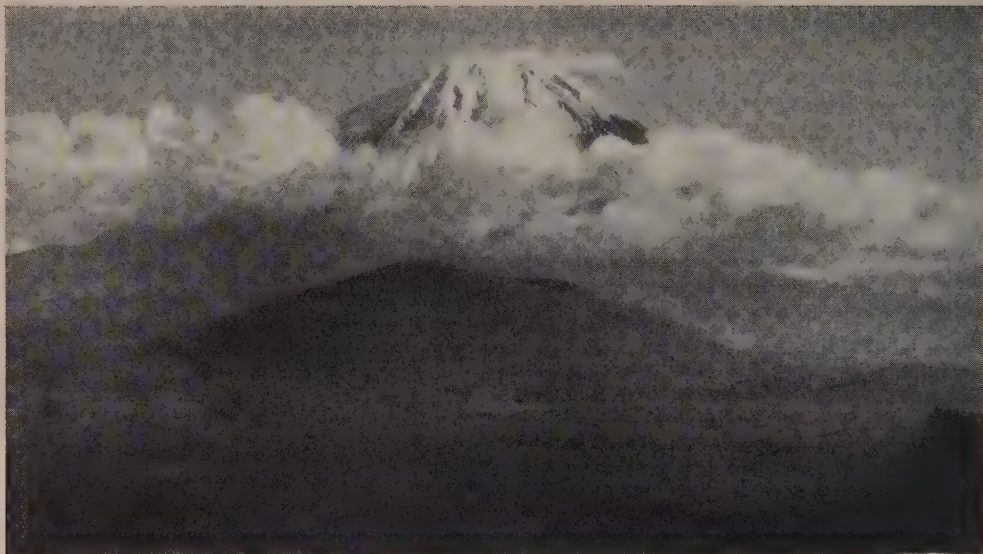
At first sight this looks like another picture of cliff and sea-shore. Actually it is the edge of an enormous expanse of sand-dunes advancing in finger-like ridges upon a level plain. The sand is glistening white, and the ever-shifting dunes, with their wave-like crests, cover 270 square miles. Such dune fields have been known to engulf whole towns. This scene is in arid New Mexico

comparing both objects, must necessarily confess."

If John Ray's pleasure in the Weald tempts us to recall our own memorable view-points, the first breath-taking glimpse of the Rockies from the High Plains, the level blue ridges of the Appalachians (carved from an old block these) seen from the Potomac, the sight from the ship's deck of a lurid lava stream rolling down the side of Stromboli at night, we shall notice that of the last of the three, the volcanic mountain, no explanation has so far been given. The popular fancy that the earth's crust embraces tightly a seething molten mass that at any moment, and at any place, may find a vent and gush out horribly over the surface, has no foundation in fact. Active volcanoes are found chiefly in the 'new' mountain belts, particularly in the girdle round about the Pacific Ocean, and also along the lines of fracture which result from strains in the more rigid parts of the earth's crust. The islands of the Hawaiian group as far as Midway Island, for example, result from volcanic activity along a thousand-mile fracture in the Pacific floor. But each volcano owes its eruptions to its own particular pocket of magma, so that of two craters only a few miles apart one may be in violent action and the other remain perfectly quiescent. As to what sets the eruption going there appears no certain answer, but it appears to be some sort of chain reaction which, once started, proceeds (like that of the 'pile' of an atomic bomb) with multiplying violence until it culminates in an explosive outburst of rock fragments and dust, with or without an

issuing lava stream, which nothing can stay or turn aside. The beauty of a volcanic cone resides largely in its symmetry, a natural result of the way it is built up by impartial ejection of material from a central vent, while the graceful running curve of its flanks as seen in silhouette depends upon the angle of rest of the lava and cinders which compose it. Unlike all other mountains the volcano has a life-span that may be truly short, well within the compass of recorded history. Men have seen new volcanic islands rise from the floor of the Aegean Sea overnight, they have witnessed the vanishing of full-sized volcanic mountains in a matter of moments, shattered to fine dust with a violence only lately paralleled by the destruction of Hiroshima.

If volcanoes, with the associates of their old age, solfataras, fumeroles, geysers and hot springs, awe us by their exotic character and unpredictable behaviour, so too a desert landscape holds an element of terror, for the very starkness, abruptness and unfamiliarity of its outlines. A sculpturing agent has been in fact at work which finds very little scope in our own softer scenery, namely the wind. Not that the wind alone has any potency, but in the absence of any moisture or vegetation to fix the soil, a wind of even moderate force soon catches up enough grit in the desert to become a powerful sand-blast. Rock floors are rubbed smooth, pebbles are polished, joints and crevices are opened out and cliff faces etched into fantastic shapes, often taking on the semblance of giants' castles. And where the wind-driven sand encounters an



Paul Popper

(Above) "The beauty of a volcanic cone resides largely in its symmetry." Fujiyama, with a smaller volcano in the foreground. (Below) "Unlike all other mountains the volcano has a life-span that may be truly short." Superheated steam, poison gases and ash, hurled from the bed of the Sunda Straits between Sumatra and Java, built this islet which, after a temporary appearance in 1928, reappeared in 1930 and is now more than three-quarters of a mile long and 200 feet high

obstacle, there a dune is built, a chain of dunes, a sea of dunes, a vast ocean of dunes, with a spume of yellow sand blowing from the wave-crests in place of a spume of white foam. Sometimes the dune ocean, the Great Erg, is on the move, advancing with dreadful inevitability to choke the wells and overwhelm the oases, and bury the passing caravan.

But the whole story of desert landscape is not a story of wind and sand, for although it may not rain in the desert for years, there is tropical violence when the rain comes at last. Torrents of water scour, scar and ravine the hillsides, stones and sand and water whirl together along the formerly dry wadis, perhaps drowning the unwary camper. Then as suddenly as they came the waters disappear in the thirsty earth, and with a cracking like pistol-shots the rocks split under the hot sun as they split again under the frost after night-fall. It is the absence of a carpet of vegetation that exposes the desert to such destructive violence, and by too careless or greedy meddling with the natural grasses and forests elsewhere mankind can easily create a desert, and indeed has done so. But this again is to speak of a Landscape with Figures, which must await a later occasion for anatomizing.



From 'Der Erdkreis' (Atlantis-Verlag)



I. A. Brown

The Chameleon

by W. T. MILLER

CHAMELEONS, those remarkable little reptiles whose peculiarities have become almost legendary, are a commonplace in Africa. One finds them almost daily in the garden shrubbery, stretched among the creeper around the tennis court, or even walking with painful slowness across the main street. Among branches and greenery the chameleon is comfortably at home, but on the ground it is badly out of place; however unwillingly, it must sometimes in a town be unable to avoid the open spaces. In the white glare of the sunny roadway the chameleon's colour recedes to a light-greenish yellow. Deliberately it lifts a foot. With the foot still raised and only half advanced it sways back and forth, back and forth, as if trying to force its way through invisible obstacles. Finally the step is completed, another foot lifted, and the process repeated. The chameleon has no particular date to keep and is quite content to go a little way in a long time. If startled, though, it can break into an awkward, long-legged stride that gets it away with deceptive speed.

The chameleon is a tree-dwelling lizard which feeds entirely on insects. These two facts are the explanation of all its unusual characteristics. Every peculiarity which the chameleon possesses is an adaptation either to its tree life or towards success in catching insects.

It is fairly well known that most foliage- and flower-haunting insects have the ability to distinguish colours to some extent. The chameleon's power to match its own colour to its surroundings is directly related to the insects' colour perception, and is of greatest importance in enabling it to deal with a quarry much more active than itself. Not that the chameleon deliberately harmonizes itself with the tints of the leaves among which it waits. The change is more or less automatic, and controlled by the intensity of the light in the chameleon's immediate surroundings. The lower layers of the chameleon's skin contain odd-shaped pigment cells with many slender branches stretching to-

Unlike the dwarf chameleon, which produces its young alive, the bigger chameleon lays eggs. It has little maternal instinct, for it simply covers the eggs with soil and the young, when hatched by the sun, have to fend for themselves



wards the surface. These cells hold colouring matter, usually black, pink or yellow, which can be diffused through all the cell branches or concentrated into tiny points in the deepest part of the cell. The black pigment cells act in a general darkening of the whole skin, sometimes so strongly that the ordinary green colour is altogether lost. Besides the pigment cells there are others which contain oils and solid crystals, both of which affect the colour changes. Reds and blues are beyond the chameleon's colour-changing powers, but the combinations of green, yellow, grey, brown, black and white are almost endless. At night its colour fades to a pale-creamy yellow; by day it is usually greyish-green with a number of light and dark patches.

To some extent the hue of a chameleon's skin will change by direct stimulus of light, but the main controlling factor is the light received through the eyes. Since the eyes act independently of each other, it is not unusual to see the two sides of a chameleon's body to be quite different in colour, as for instance when it is on the edge of a shrub. The eye turned towards the darker interior of the shrub receives much less light and that side of the body is consequently darker than the side facing the sunlight. A blind chameleon can no longer even approximate the tone of its surroundings. A short while ago, I found two chameleons fighting in my garden path. They were twined together in a writhing,

hissing heap, with their jaws closed fiercely on each other's bodies. One was vivid green in colour, the other a dull black. As I watched, the black one tried to break free and retreat, but the green one made fresh darts and renewed its crushing hold, until it saw me and made off hurriedly (for a chameleon). The black one stood rocking from side to side, and then began to stumble aimlessly about. Its eyes were crushed in, the long conical sockets compressed and bent and the round pupil at their tip lost. Yes, the chameleon was blind. It tottered this way and that, its colour unchanging in light or shade. Soon it halted beside a stone and rolled over, dead.

These colour changes made under the varying stimuli of light are cryptic, concealing the chameleon from its quarry. There is a further colour change due to emotional stimuli which serves a different purpose—that of warning. When a chameleon is disturbed by poking fingers or by a queuing bird or dog, a sudden and startling change comes over it. My fox terrier puppy discovered one in the garden and made a playful snap at it. In an instant the chameleon's skin became almost black, except for a swollen, yellow-striped pouch at its throat. The body, originally long and slender, was blown up to twice its normal size, with its back arched like a cat's. The chameleon swayed from side to side, hissed alarmingly, and launched

Not only can the chameleon change the colour of its skin, but at times it obtains a new one by sloughing the old



When angry, it blows itself up, turns almost black in an instant, and, swaying from side to side, hisses until fit to burst



itself in swift repeated darts at its enemy, with wide-open jaws. The effect was terrifying, and the puppy was bluffed into a strategic retreat. "Bluffed", because the whole effect is false. The chameleon is entirely harmless, and cannot even deliver a painful nip with its toothless jaws.

Another noteworthy adaptation to arboreal life is the chameleon's divided feet. Its five toes are opposed to each other in groups of three and two. In the forefeet three toes point inwards and two out, but in the hind feet these groups are reversed. The long tail too is strongly prehensile, enabling the chameleon to anchor itself very firmly among slender, swaying branches. I have watched a chameleon, almost dislodged, hang head downwards with only the tip of its tail gripping a twig, then curl round and climb 'hand over hand' up its tail again to safety.

Outwardly, perhaps the tubular protruding eyes of a chameleon are the features one notices first. It is uncanny to watch one eye looking directly forwards while the other is swivelled to look backwards. The upper and lower eyelids are joined together in a conical turret, in the apex of which a small circular hole is left for the eye. Often only the moving of these eye-tubes betrays the presence of the chameleon, for they have otherwise remarkable powers of keeping still. When a fly or beetle or grasshopper is sighted, both eyes focus on the quarry, enabling the reptile to make an accurate judgement of the distance, which may be as much as six inches. Then comes into action that final wonder, the chameleon's tongue. The lower jaw swells a little, the mouth opens slightly, and between the lips something like a greyish ball of chewing gum appears. Suddenly the club-shaped tongue shoots out like an elastic tube,

and the broad, sticky tip lands squarely on its mark. Back the tongue springs, carrying the insect. It is over in a flash. The chameleon chews for a moment, drops the hard parts out of the side of its mouth, and swallows. The stickiness of the tip is just strong enough to hold its victim; the chameleon has no difficulty in freeing its tongue from something it does not wish to hold. Once or twice I have seen a chameleon get its tongue onto a locust too big to be pulled back to its mouth. Then it kept the tongue extended, firmly pinning the locust down, while it walked forward until it could use its jaws.

Some chameleons, like the dwarf chameleon (*Lophosaura pumila*) common in the Cape, produce their young alive. The bigger chameleon (*Chamaeleon dilepis*), which is most often met further north in Rhodesia, lays eggs in the lizard tradition. I came across one digging in the loose soil of the rubbish pile, scooping out the earth with its broad feet, and shoving it away behind. The eggs, oval and white, nearly half an inch long, with a shell of tough skin-like material, were dropped in the bottom of the hole. They

The prey sighted—



Advancing—



Nearer—



Whizz! Got it!





All photographs by the Author

Happy realization. That astonishing wonder, the tongue, has now done its work. When the prey is sighted, a greyish ball, like chewing gum, appears between the lips. Suddenly the tongue shoots out and lands squarely on its mark. Back it springs carrying the insect. All is over in a flash

were covered with soil and dead leaves again by the parent, the place smoothed over, and then they were left. The chameleon has no more care for them. They will hatch, if the soil remains damp, in about four months' time, into small green chameleons about an inch long which will wander off to find their own living. They seem to have very little power of colour-changing during the early part of their lives, but they have many enemies. There is a bauhinia tree in our garden which is part of the territory of a pair of fiscal shrikes. They use this tree as a larder although it has no thorns or spikes. It is a gibbet. It has many thin forked twigs which form a narrow Y. Into these forks they force the necks of half-grown chameleons which they catch in the shrubbery, and leave them dangling there until wanted. We have counted as many as seven there at the same time.

Nor is there any friendliness between a juvenile chameleon and an adult. We had a fully-grown specimen in a room for observation and one day brought a small one to join it. The smaller one scuttled away. The larger one hissed and gave chase, and finally

caught it by the back of the neck. It gave a vicious squeeze and shake, whereupon the small fellow ejected a mass of half-digested insects on the floor. The adult chameleon let go its hold promptly and swept up this prize with a quick dart of its tongue. Apparently satisfied with the offering, it left the small one unmolested afterwards.

Chameleons, dried and mummified, figure frequently in a witch-doctor's outfit. All through Africa the natives hold the chameleon in considerable dislike and fear. There are many stories to explain this dislike. According to one (which with minor variations is common right throughout the continent), in the beginning of the world the Creator chose the chameleon as a messenger to take to mankind a promise of eternal life. The chameleon went along at his slow, hesitant pace (he is commonly called "*Hamba Gahle*", go slowly). And in the meantime the Creator sent a second messenger, the tree lizard, with a new command, "*Men must die*". The lizard, of course, arrived first and delivered its message. So the slowness of the chameleon brought mortality to men and hence earned their hatred for evermore.

God-Makers of Sivarapatna

Notes & Photographs

by LIBRA

GODS IN STONE

Traditional craftsmanship shapes the sacred bull of Siva—a favourite Hindu god, worshipped as both creator and destroyer, since death leads to new life



Sivarapatna, in the State of Mysore, South India, is a village of god-makers. From time immemorial thousands upon thousands of images in stone and metal have emerged from its primitive 'studios' into the world of worshippers. The demand for gods and goddesses is still as strong as ever and the workers of Sivarapatna get plenty of orders. Every builder of a temple wants quite a number of images for installation in it: these are supplied out of the village stock, for Sivarapatna contains hundreds of images ready for sale. The village's inhabitants belong to the Panchala caste of sculptors and artists, born to their trade which, like all

caste professions, is hereditary. With their inherited skill goes a genuine creative gift, often applied to specific orders given by particular customers. Their methods are regulated by an ancient treatise on Hindu iconography, the Silpa-shastra-Vishnusila. This recommends, for example, a special stone for sculpture, which is stocked in large quantities at the village; and a certain alloy for metal-work. Versed in the theory as well as the practice of image-making, and supported by their artistic tradition, the god-makers of Sivarapatna are a proud set of people, dignified in their manners and conscious of their superior ability over other men



(Above) From father to son the sculptors of Sivarapatna hand down their art, every doorstep a studio with master and apprentice working side by side. (Below) All the stone used is tested for 'purity', but flaws may reveal themselves as the image emerges. This god represents six months' labour lost: a flaw appeared and carving was abandoned since only flawless images may be worshipped



GODS IN METAL



Sivarapatna's metal-workers use the ancient cire-perdue process, applying it to an alloy of five metals, the Panchaloha, prescribed by Hindu iconography. (Left) The first step is to shape in wax a rough image, which is covered with wet clay. This hardens in the sun—



—to form a mould. Next, the mould is heated over a fire: the wax melts and runs away. The metal alloy is then poured into the hollow and allowed to cool; the outer case of clay is broken and a metal image tumbles out



(Above) Gods and goddesses in the rough, as they come from the mould. Many days' work is required before they are ready for sale, both in perfecting (right) their details and in giving their smooth surfaces a final polish



Working with the simplest of tools, the god-makers of Sivarapatna achieve results of startling vigour. Their animal figures, such as the prancing horse, may seem over-ornate to modern Western eyes but their artistic lineage is respectable



For countless generations their products have responded to a need that will endure with the gods themselves. Hanuman, the monkey-god, is supplicated on numerous occasions; that he can give effective aid is shown by his action as general of the monkey forces allied with Rama in the Ramayana, most popular of Hindu epics, which contains a prophecy that it will always live on the lips of men



The garuda, half eagle and half man, is the ethereal vehicle of Vishnu, second person of the Hindu trinity, who represents the preserving power in nature and is held to have saved mankind in ten incarnations; the heroes Rama and Krishna, a prominent warrior of the Mahabharata, were two of these

Radar and Weather Forecasting

by F. L. WESTWATER

An article in our June number described the general principles and some peace-time applications of radar, with special reference to navigation, and mentioned briefly the fact that radar sets could pick up echoes from certain types of cloud as well as from more solid targets. The following article shows the great importance to meteorologists of this new method of exploring the atmosphere

THE relationship between meteorology and radar is a fascinating one and has received close study both in Britain and in the United States during the last three years. For security reasons, nothing could be said about the subject until very recently, but it is now possible to give some account of the results so far attained.

When a radar beam encounters a water drop in the atmosphere a portion of the energy is scattered in all directions. A small fraction of this energy is sent back to the receiver. When there is a sufficiently large concentration of drops in the atmosphere, enough energy may be picked up by the radar receiver to produce an echo. An important feature of this scattering process is that, for a given wavelength, large drops are much more efficient than small ones—so much so, for example, that the drops in light drizzle or fine-weather cumulus clouds are quite unable to send back enough energy to be detected. Rain-drops on the other hand, or the large drops found in the centre of a thunder-cloud, are sufficiently powerful scattering agents to enable a strong echo to be detected. Fortunately, so far as their operational use is concerned, the echoes from clouds or rain-storms are easily distinguishable from those from aircraft or ships. On a Plan Position Indicator the size of the echo corresponds almost exactly with the extent of the rain-storm or cloud. If the standard type of range tube presentation is used, the echo from a cloud is broad and fuzzy in outline (see fig. 1) and fluctuates in brightness, while the echo from an aircraft is narrow and sharp and normally remains constant in brightness. For weather forecasting the P.P.I. provides a powerful tool to the meteorologist, because he is able to have before him a bird's-eye view of all the rain areas or potentially dangerous clouds within a radius of about a hundred miles. Both the motion and, what is just as important, the development of storms can be studied on the screen.

The basis of modern weather forecasting is the so-called frontal theory as developed

by the Norwegian school of meteorologists. Fronts are the boundary regions between air masses coming from different geographical sources and therefore possessing different properties. These boundary regions move at speeds sufficiently constant for their motion up to twelve hours ahead to be predicted and the weather conditions associated with them to be forecast. If, as the front moves, the air passing a stationary observer changes from cold to warm, the front is referred to as a warm front; if from warm to cold, it is called a cold front. At a warm front the warm air is forced to climb up over the underlying cold air and its approach can therefore be detected by the presence, first at great heights and steadily descending, of a well-known series of cloud types, ending with a broad belt of low cloud and rain. In the case of a cold front the heavier cold air approaches and undercuts the lighter warm air; clouds are formed and rain is produced, but this time they arrive with the front instead of preceding it.

This has important practical consequences. The farmer or fisherman who appreciates the significance of clouds can foretell the approach of rain and bad weather, but it is far more difficult because of the absence of precursory signs to tell when bad weather is going to clear. Here radar provides a new aid to forecasting.

A warm front is normally associated with a broad belt of rain which may persist for several hours at a given spot. The P.P.I. (fig. 2) shows the front edge of the rain belt as well as its extent. On the passage of a cold front heavy showers usually occur. These showers show up in a distinctive manner on the P.P.I., as illustrated in fig. 3. It will be noticed that forecasts based on the P.P.I. presentation do not differ in principle from those based on the usual type of weather map. In each case the observable motion of rain belts is calculated, then their future motion is predicted and forecasts of the corresponding weather are made. The advantage of the P.P.I. is of course that the information is far more detailed and accurate than that on the weather map can ever be.

The forecasting of thunder-storms and scattered showers is much more difficult than that of the 'frontal' sequence because they do not move in a predictable way but appear in a discontinuous manner, and only last for a relatively short time. Using ordinary forecasting methods all that can be said is that showers or thunder-storms are probable. Where or when they will appear it is quite impossible to say. The P.P.I., however (fig. 4), can detect at once whenever a cloud is developing dangerous tendencies and can give about fifteen minutes' warning of exactly where the rain is going to fall. Even this short notice can be of great value, for example at an airport. Moreover, a really heavy shower can frequently put an electric power station out of action, thereby causing a breakdown in power supplies over a large area. If fifteen minutes' warning is given alternative supplies can be arranged and breakdowns avoided.

A most impressive illustration of the value of radar in detecting storms is shown in fig. 5. This P.P.I. photograph was taken on board an American aircraft carrier in the neighbourhood of the Philippines in December 1944 when the ship was about forty miles from the centre of a typhoon. It shows up clearly the characteristic structure of a typhoon, consisting of a central core which is an area of clear skies and calm, surrounded by the main storm area with winds of hurricane force blowing low clouds and heavy rain round the centre. The central core, referred to by seamen as the 'eye' of the storm, is easily recognized on a P.P.I. because of the absence of rain and thick cloud, and by plotting its position at frequent time-intervals reliable estimates of the future track of the typhoon may be made, and the ship should be enabled to steer for a safer area.

RADAR WIND-FINDING

A knowledge of the direction and speed of the wind is an essential feature in the prepara-

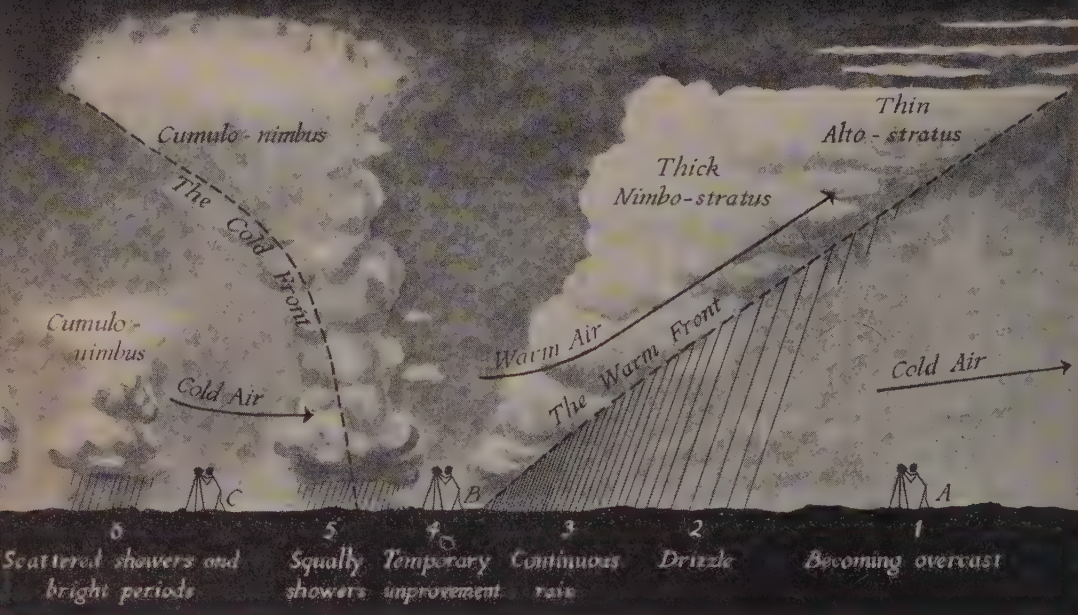
tion of a weather forecast. So far as the surface wind is concerned there is little difficulty in getting sufficient data, but it has been realized for some time that progress in weather forecasting depends to a large extent on the taking into consideration of developments at higher levels. It was this need for upper air information that led to the development of radio sonde technique. A radio sonde consists of a light wireless transmitter which is suspended from a balloon and is so arranged that it can send out signals which can be received on the ground and there translated into readings of pressure, temperature and humidity. Considerations of expense limit the number of radio sonde stations and the frequency of balloon ascents made from them.

In addition to temperature and humidity, however, a knowledge of the upper wind speed and direction is necessary if full use of upper air data is to be made. In fine weather this presents little difficulty. Balloons which have a constant rate of ascent are released and their subsequent course is followed by an observer with a theodolite. The wind at any height is readily calculated from the angles of elevation and direction obtained with the theodolite. Fine weather is much less interesting from a meteorological point of view than bad weather; and in bad weather the above-mentioned method of measuring upper winds fails completely because the balloon is almost invariably lost in an overcast sky before it has risen to more than a few hundred feet. This is particularly unfortunate because a knowledge of the wind structure in the higher strata of a 'deep depression' would certainly lead to a better understanding of the physical causes of such depressions, and this in turn would lead to better forecasts.

The application of radar technique has completely altered the position, and we may look forward to some interesting developments when sufficient observational material

A 'line' radar presentation. The wide and blurred deflection is made by a cloud, and may be compared with the sharp deflections made by ships or coastal features shown on a similar trace on p. 90 of the June number



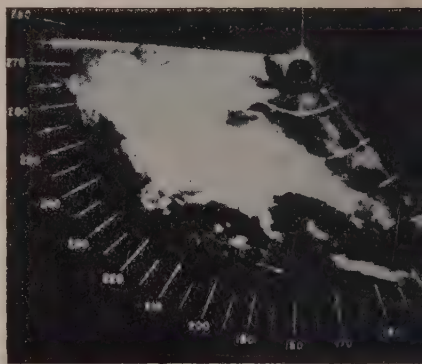
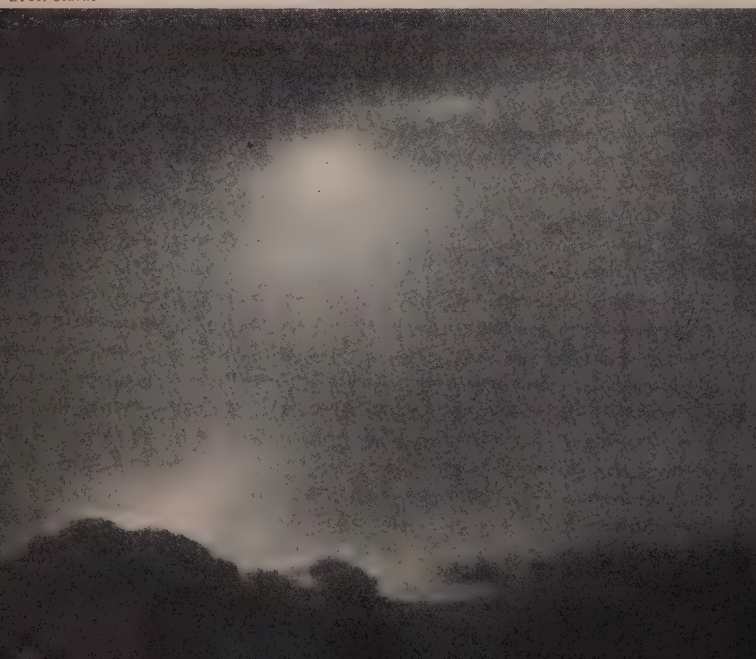


T. S. Heffernan

Vertical cross-section through the centre of a depression. On the right at the Warm Front, warm air is being forced to climb up over the underlying cold air. Condensation results with the cloud and weather sequence as shown. On the left a wedge of cold air is undercutting the warm air giving a line of showers at the steeper Cold Front. Scattered showers occur in the cold air behind the front

A (Below) Typical appearance of sky with approaching warm front, as seen from A. The sun appears dimly through the thickening alto-stratus cloud. The lowering cloud and rain in the distance are advancing. The rain area shows up clearly in the P.P.I. picture (2)

G. A. Clarke



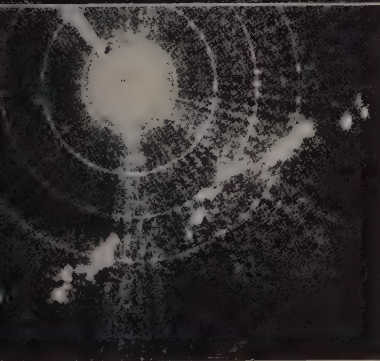


4



Royal Meteorological Society

Characteristic appearance of well-developed thunder-cloud, as seen **C** from C. The strong vertical air-currents in such clouds enable large rain-drops to be held in suspension. These give bright and sharply defined echoes on the P.P.I. picture (4) for each shower

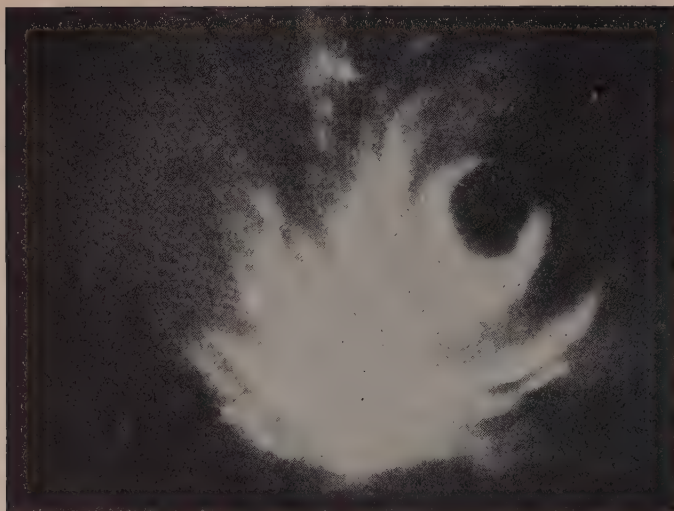


3

(Below) Typical cloud structure with approaching cold front, as **B** seen from B. Along the front itself, heavy showers occur. Cold fronts are particularly easy to identify on the P.P.I. picture (3) because the shower echoes form a well-marked line along the front

Royal Meteorological Society





By courtesy of U.S. Navy

Appearance of typhoon on P.P.I. scale. The 'eye' of the storm with its absence of rain and cloud is clearly marked. Absorption of the radar beam limits echoes from the far side of the storm centre

5

has been obtained. It is possible nowadays, by attaching a light target to a balloon, to follow it by radar after it has entered the clouds, and an exactly similar process of calculation to that employed in the visual method enables the wind to be found. The radar method has two advantages. First, it has potentially greater range—balloons carrying targets have been followed up to a range of sixty miles, which is far beyond the capacity of a theodolite telescope. Secondly, the more up-to-date types of radar equipment enable the angle of elevation as well as the bearing and range of the balloon to be observed, and this enables the vertical currents in the atmosphere to be measured. Since the large-scale vertical currents in the atmosphere are the prime cause of all bad weather, this application of radar may well prove to be of fundamental importance. The pictures on page 187 show the types of target which are attached to the balloon.

EFFECT OF WEATHER ON RADAR PERFORMANCE

Enough has been said to show how useful the radio engineer can be to the meteorologist, but, as a matter of fact, it was the radio expert who had first to seek advice and help from the meteorologist in unravelling some of the problems associated with radar performance. The resulting partnership has led to the development of a new branch of science which is called Radio-Meteorology. Thus,

on the one hand, the use of radar is of substantial assistance in improving the accuracy of ordinary weather forecasts, while, on the other, the peculiarities of radar performance under various weather conditions call for a special type of weather forecast of quite exceptional difficulty. The close association of research workers in the fields of radio and meteorology has been most profitable in the past, and should prove even more so in the future.

The effect of weather on radar performance was noticed very shortly after the installation of the first coast-watching radars in the British Isles. These sets had an expected range which was found to be realized under normal conditions. On occasion, however, ships were picked up and plotted at four or five times the normal range, and observers on the South Coast reported that the French coastline was appearing on the screen now and then at a range of about seven times that believed to be the limit of the set. It was remarked that these freak ranges were associated with fine weather, whereas in disturbed weather ranges were almost invariably normal. Later on when radars had been installed in other parts of the world where more extreme conditions of climate prevail, it was found that the violation of the orthodox rules of radar performance was even more marked than at home. Near Bombay for example, during the hot season, ranges up to 1500 miles have been obtained by a set which has an expected range of only twenty miles. The

Meteorological balloon with corner reflector target immediately after release. The target can be detected by radar long after the balloon is out of sight



R. G. Ross

Targets are made of conducting material either in the form of a nylon mesh, completely covering the balloon, or a corner reflector target which hangs from the balloon

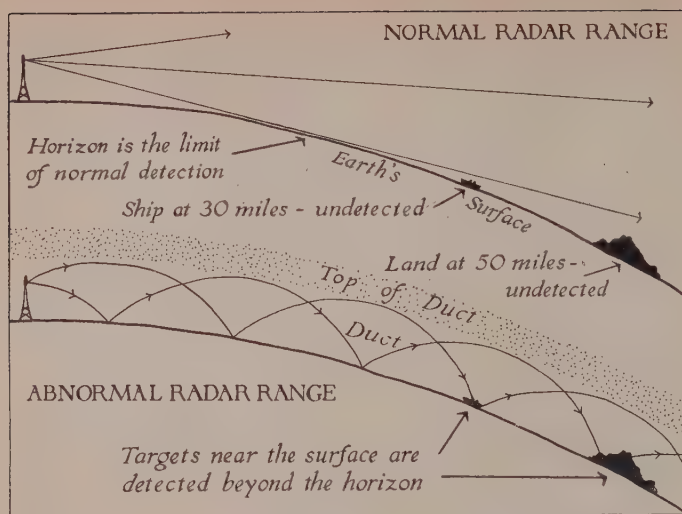


R. G. Ross

term 'anomalous propagation' has been coined to describe this phenomenon, but anomalous must not be interpreted in the sense of unusual. In parts of the world conditions are anomalous for about 80 per cent of the time for months on end. The increased ranges of radar sets are of course shared by communication equipment such as radio telephones, provided that they operate in the same region of wavelength.

The prime cause of the increased radio and radar ranges is refraction or the bending of rays by the atmosphere. Such refraction is quite well known in optics and is the cause of mirages, but it is rare in this country for conditions to be sufficiently intense for

a mirage to be caused. As a matter of fact a striking example occurred as recently as last April when observers at Bridlington were able to see clearly the town of Hull, which is far too far away to be visible from Bridlington under normal conditions of vision. Ultra-short radio waves are affected differently from light rays in that they are influenced not only by the density of the atmosphere but also by the amount of water vapour it contains. When the amount of water vapour present decreases with height, the rays are curved downwards and are able to follow the curved surface of the earth and thus to detect ships or coastlines below the horizon.



T. S. Heffernan

Under normal atmospheric conditions radar beams pass into space after reaching the horizon, leaving targets below the horizon undetected. When there is a strongly refracting layer near the earth's surface, however, the radar beams are trapped in the 'duct' and can detect targets on the surface far beyond the horizon

Sometimes the conditions in the lowest layers of the atmosphere are sufficiently intense to cause the radar rays to acquire a downward curvature greater than the earth's curvature. In such cases a portion of the energy in the radar beam is trapped in a layer close to the earth's surface. Such a layer is called a 'duct'. The meteorological circumstances which are favourable to duct formation are that the air should be warmer and drier than the underlying surface. Such conditions are commonly found on the sea in summer when air which has been warmed by contact with the land drifts out to sea. The difficulty of forecasting the occurrence of the trapping process which is the chief cause of freak radar performance lies in the fact that it is necessary to forecast in three dimensions. The rate of change of both temperature and humidity with height is necessary, and forecasts of this type have not hitherto been required. Moreover the radar ranges are extremely sensitive to small changes in the weather conditions.

FUTURE DEVELOPMENTS

It has already been mentioned that the echo from a collection of water-drops depends to a great extent on the size of the drops. The reflecting power of a drop, as a matter of fact, is proportional to the sixth power of its radius. Thus, for example, if we double the size of the drop its reflecting capacity is multiplied by 64. It is therefore possible with a radar beam to explore the structure of clouds and, from the brightness of the echoes received from

various regions, to form an idea of the distribution of drop size and concentration in the cloud. Radar can thus play in relation to clouds a similar rôle to that of X-rays when used in probing the interior of metals for flaws or other peculiarities. As yet little work on these lines has been done, but it has been possible already to use radar for determining the height of the freezing level under cloudy conditions. This is due to the fact that above the freezing level snow is falling. After falling a short distance through the air which is above freezing point, the drops become completely liquid and break up into smaller drops. The reason for this is that there is a maximum size for drops of pure liquid. Drops of this size are only just able to hold themselves together by surface tension; if a drop of larger size could be made, it would immediately break up into smaller and more stable drops. The presence of a central core of melting snow, however, enables drops much larger than those possible with pure liquids to exist for a short time. When therefore a radar beam is rotated about a horizontal axis so as to explore the vertical extent of a cloud, a narrow region giving an echo of intense brightness is detected. Just above the height at which this echo is observed is the freezing level. Such information is of considerable value to aircraft and may enable them to avoid the highly dangerous parts of clouds in which icing occurs—a particular example of the far better understanding of the structure of clouds, and of the way in which they form, that thanks to radar we may soon expect to possess.

Military Scarlet and Billiard Cloths

A Gloucestershire Village Industry

by J. ALLAN CASH, F.I.B.P., F.R.P.S.

In the pretty Cotswold village of Cam, a few miles from Stroud, there is a large modern textile mill. It is surprising to come upon such a sign of up-to-date industry among the peaceful green fields and woods and rolling hills of Gloucestershire, and more surprising still to learn that this mill produces the best military scarlet and billiard cloths in the world. One wonders why, and upon investigation it is discovered that the art of making these high-quality cloths lies, as much as anything else, in the skill of the villagers who, for generations in some families, have worked at this mill. Individually they cannot tell you why their particular work yields such good results; experts can watch them closely as they work, yet cannot discover wherein lies the extra touch of skill.

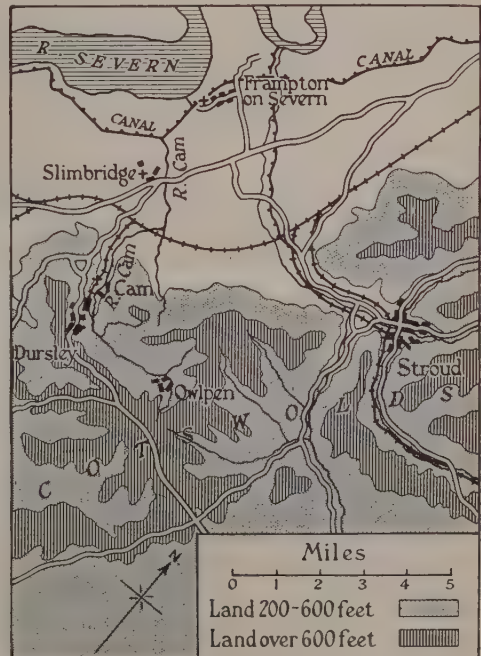
The business originated many years ago, when the Cotswolds were one of the great sheep-rearing districts of England. Records show that the woollen cloth industry was established in the Cotswold valleys round about Stroud well before the dawn of the 16th century. Much of the work was done in the cottages, on the old hand looms; it was the processes which follow the weaving that came to be done in mills—the fulling and dyeing and so on. These processes required both water and power, and so came to be established in the valleys where streams could be dammed and water-wheels installed.

Although it was the wool of the Cotswold sheep which was responsible for the industry locating here, today it is not Cotswold wool that is used, but that of the Australian merino sheep, from the opposite side of the world. Australian wool is of much finer quality, and hence must be used if the highest quality cloth is to be produced.

The Cam is mentioned by Rudder, in 1779, in his *History of Gloucestershire*. He says: "The river, which runs through the village, rises at Owlpen or Ewlpen, and passing by Dursley, where it is considerably augmented by the water of that place, takes its course through

this parish (of Cam), and Slimbridge, and empties itself into the Severn at Frampton-Hill. It feeds no kind of fish except eels, on account of the great quantity of dye-stuff thrown into it. The course of it is crooked, like an arch or bow wherefore it was called the 'Cam' which, in the British language signifies Crooked, and the village took its name from the river."

Military scarlet and billiard cloths are very similar. They are made of the same kind of wool, go through all the same processes; only in width, dyeing and cropping do they differ. Military scarlets are not as wide as billiards; they are dyed scarlet, of course, instead of green, and they are not cropped quite so many times.



Stanford, London



The first process in the making of these cloths lies in the sorting of the wool. This is a highly skilled job, calling for a long apprenticeship until the sorter is able to separate the various qualities by sight and touch. Australian wool may come direct from Australia or through the London wool sales. Some of it comes 'in the grease', which means in complete fleeces as it is shorn off the sheep's back, complete with all the wool fat, known as lanoline or 'suint', and the dust and burrs which the sheep collect on the grazing grounds. Other wool arrives 'seoured', that is with most of the grease and other impurities removed. Bales of wool average about 320 pounds in weight; they are opened in the mill and the fleeces unrolled for sorting. This is necessary because the wool from different parts of the fleece varies in quality. The best comes from the shoulders of the animal, the coarsest from the belly and legs. Hence a sorter pulls the fleeces apart where his practised hand and eye tell him that the fineness of the wool changes.

The wool is thrown into large baskets and taken away to the blending room. Here the wool from different 'marks', or stations where it is grown, is piled up in definite proportion, as no one mark of wool will produce all the necessary qualities. Blending also serves to preserve continuity of quality, as part of each blend is left to form the basis of the next. Both scoured and greasy wool may be blended together, but whether it is mixed or greasy alone, it has next to be washed to remove the grease and other impurities. These may amount to over half the weight of the raw wool; but it is not all waste, for the lanoline is recovered and sold for a variety of purposes. Scouring consists of soaking the wool in long troughs full of hot soapy water and alkali. This removes the grease but burrs have to be removed by a further process with acid followed by baking, which reduces the vegetable matter to dust but leaves the wool unharmed. The dirt, as might be supposed, is removed along with the grease.

The clean wool is then placed on the floor in special oiling rooms, where it is sprayed with an emulsion of oil and thoroughly mixed up together, thus preparing it for spinning. But first it must go through the carding process, which is the drawing-out of the wool into continuous untwisted threads.



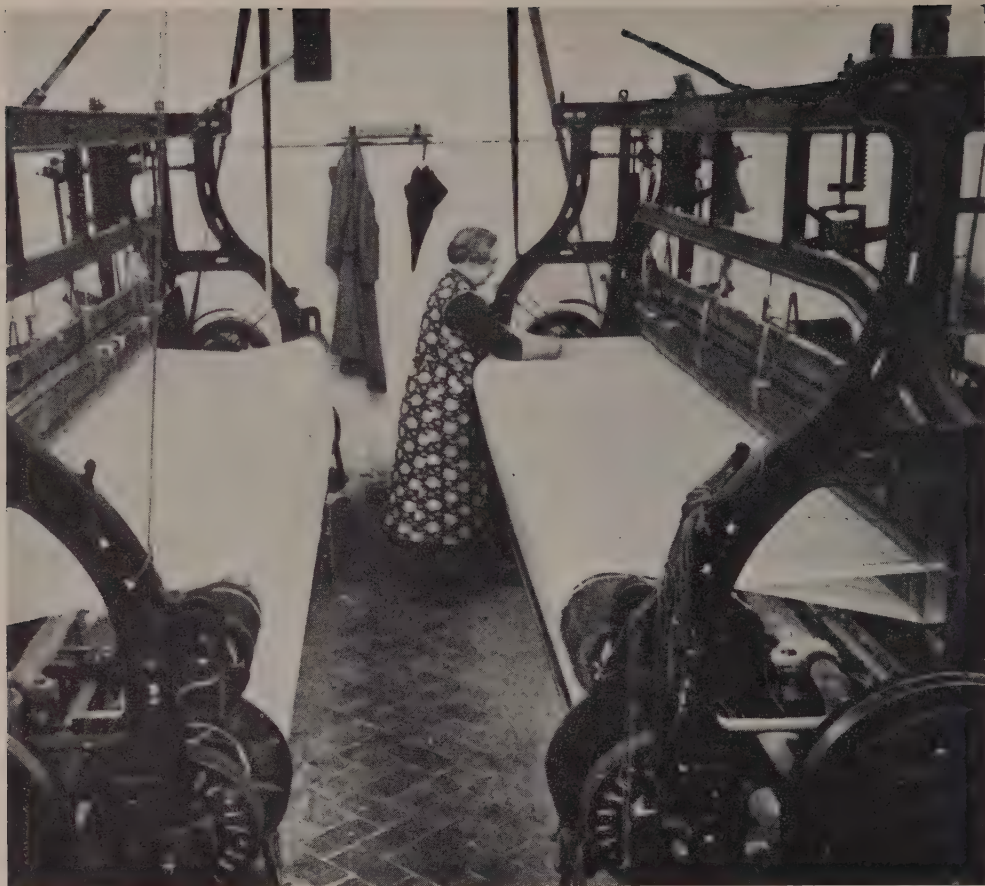
All photographs by the Author

A carding machine consists of a series of rollers in close contact which are covered with felt, in which is fixed a dense mass of wire pins giving the appearance of a coarse metal brush. Wool passing through these rollers is separated and opened out into a very fine, gauzelike web which is then seized by a machine called a condenser. This breaks the web and, by a combined rolling and rubbing motion, converts it into large untwisted threads which are wound on to spools at the extreme end of the machine.

Fifty or sixty years ago these threads would

have been spun in an 'old billy' or a 'jenny'. But today these old-fashioned methods have given place to the 'mule', one of the most wonderful machines in the woollen trade. It consists of several hundred spindles, to each one of which one of the rough threads from the condenser is attached. The 'mule' then proceeds, entirely automatically, to draw out a measured length of the thread and to twist it into yarn ready for weaving. Each length when it is spun is wound on to a bobbin, then a fresh length is drawn out and the process repeated.





This twisted thread is now known as yard, and it is ready for weaving into cloth. In the case of military scarlet and billiard cloths the same kind of thread is used for the warp, which runs from end to end of the piece, and the weft, which runs from side to side. This cloth is usually made in plain weave, which means that the weft alternately rises above and sinks below the warp.

The weft yarn usually goes directly from the mule to the weaving loom, but the warp is first wound in sections onto a warping mill and then onto a beam, which is placed on the loom. Billiard cloth, when finished, is 72 inches wide, and may have as many as a hundred warp threads to the inch, so that, in all, there will be perhaps 7000 warp threads on the beam. The cloth for military scarlets is somewhat narrower. Very large looms are required for the weaving, because the shrinkage of wool is so great. To obtain a finished cloth six feet wide it is necessary to weave a

cloth well over ten feet in width, subsequent processes bringing this down by nearly half.

The loom, of course, effects the interlacing of the warp and weft. Half the warp threads are raised, the other half lowered, then a shuttle is flung across between them, leaving a weft thread behind it from the bobbin of yarn which it contains. The raised threads are then lowered and the others raised, when the shuttle flies back again to where it started from. Thus the weft threads are laid alternately over and under the warp threads and the latter appear in the same relation to the weft threads in the woven cloth.

The cloth that comes from the loom looks like a piece of coarse canvas, dirty, stained and full of bits of burrs and other impurities. It is first inspected and weaving faults are corrected. Then it is scoured and treated with acid to remove the vegetable matter. Then the process of making it into a military scarlet or a billiard cloth begins.



The scoured woollen piece is called a 'sey', a term derived from the old word 'seg'. First of all the sey must be shrunk to approximately its final width and length, a process which also draws the threads close to each other and produces a solid surface on which the nap can be raised. The shrinking process is known as 'milling' or 'fulling', and is done in a machine which has a narrow metal mouthpiece, a pair of heavy rollers and a weighted backboard. The cloth is sewn end to end and soaked in soap and water as it passes continually through the mouthpiece and between the rollers, a process which takes several days. Shrinkage is due to the heat produced and to the lubricating effect of the soap and water.

This was one of the first processes in cloth manufacture to be mechanized. It was done by subjecting the cloth to blows from heavy wooden hammers while wet and soapy. An article in the *Dursley Gazette* for December 1, 1917, dealing with conditions

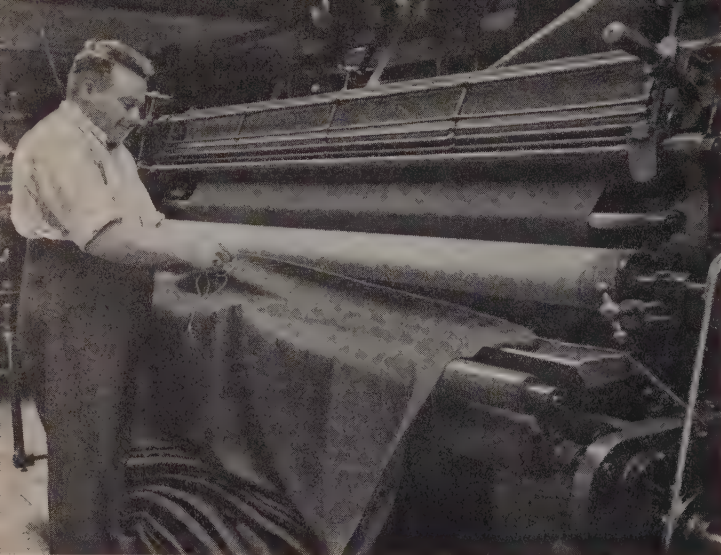
many years before then, says: "Sixty years ago the old hand loom rattled in the cottages on the hill slopes that encircle Cam, and day in, day out, night in, night out, the old fulling stocks, driven by droning water wheels, hammered and thudded in the valley".

Scouring is again necessary after the fulling process, to remove the soap. In fact, it seems that military scarlets and billiards must be continually washed and dried, between almost every process they go through after weaving. When dry this time they go through a process on machinery that is unique to the west of England. In appearance the cloth is now rather rough, some-



what like a heavy 'melton' overcoat. It is placed in a 'gig' mill for 'dressing', the cloth being continuously drawn up against a rapidly revolving drum fitted with teazles. The teazle is a common weed in England, but a cultivated variety is used for this process. It has large round seed heads covered with flexible hooks, very strong and springy. For fine cloth such as military scarlets and billiards there is no brush of fine wire or other material that is quite so satisfactory as teazles for drawing out the loose ends of the wool fibres into a fluffy nap.

New teazles are used for the first dressing, but it is essential that only old, well-worn ones should be used for the final process, to produce the softest nap.



The teazles are frequently changed during the dressing, which takes several hours. The cloth then resembles a very firm blanket and the next process is to cut off the nap. This is done on a cropping machine or cutter, which closely resembles a lawn-mower in principle, only in this case the cloth passes over a stationary cutter instead of the other way round. Both cutting and dressing are done several times, more in billiards than scarlets, until a short firm nap is produced.

Our cloth is now looking much more like the finished article. But it is still undyed and dull in appearance. And so it must go through the 'potting' process, to produce a permanent lustre, or shine on the surface. It is brushed down with water to lay the nap, rolled on a hollow metal roller and then submerged in very hot water for several hours. This is repeated several times, the cloth being reversed on the roller each time to even out the effect. It then has a lustre which nothing will remove until it is worn off.

Once more the cloth must be dried, which is done on a huge machine with rollers and frames and supplies of hot air, the cloth passing slowly through it, up and down until it is quite dry. It must then be cut again to make the nap even, after which it goes to the dye-house. Here it is sewn end to end again and drawn through a tank containing the dye, which is gradually brought up to the correct temperature, usually somewhere near boiling point. Wool absorbs dye very readily, better in fact than any other textile material. But that does not mean that the dyeing can be done carelessly. This is one of the most skilled jobs in the whole process; men spend

their whole lives at it, and their testing and matching are done with the most scrupulous care. Properly dyed, the cloth will never fade, either in sunlight or due to any other cause.

It is now nearly the finished product. But it must be run over the cutter once more, after drying, and then pressed. First it is run over a machine which blows steam into it and lays the nap with a brush. The cloth is then folded into a pile with each fold separated by a strong, highly polished piece of millboard. Twice the pile is placed in a hydraulic press, fitted with steam-heated plates, the second time to ensure that the folds from the first pressing are properly finished. Finally it is

rolled on a wooden roller, wrapped in paper and placed in the stock room ready for a customer.

Thus the finest quality military scarlet and billiard cloths are produced, after three months of continuous processing, all done with a care and skill that almost amounts to affection by simple honest folk who go home after work, not to slum houses, but to their pretty cottages down in the valley of the Cam below the rolling Cotswold Hills.



Finding the Italians

by MARY BOSANQUET

THE first town in which I began to know the Italians was Bari, the little flat Adriatic port to which five of us were posted when we went out in the summer of 1944 to work for the Central Mediterranean Forces with the Y.M.C.A. We arrived at six in the morning, stolid, British, and unprepared, and were immediately engulfed.

The Y.M.C.A. mess looked over the sea-front, but we had been given rooms at the back, 'because it was quieter'. We were soon to find, however, that the quietness was purely relative. For the back of our flat looked over a square courtyard in company with about fifty other flats, the inhabitants of which began the day about five o'clock, and occupied the whole of it, as far as we could make out, in shouting, laughing, singing, beating things, and dropping things, while dogs barked and the fowls that inhabited most of the balconies crowed or cackled according to their sex.

"Now you have a nice rest in your rooms," said the Area Secretary as he ensconced us, "and later on we'll go up to the club."

The way up to the club was a five-minute walk along the sea. As we went, small children, half hidden under dirt, swirled and eddied around us, barking in an insistent staccato rhythm: "Hay-Joe! Hay-Joe! Gott-enney chocolat-sigarette-matchiss?" And singing one particularly insistent little song which sounded like "Hay-Joe! Chingo?" and which we afterwards found was translated for those in American uniform into "Hay-Joe! Ennigumchum?"

The Y.M.C.A. club itself inhabited a great, gaunt, half-demolished building, set out on piles over the water; and it was run, as far as we could make out on first arrival, by a native staff of maniacs. This consisted in a chaotic jumble of women and boys who fell over one another all day long, singing, shouting and screeching, splashing pails of water about with irresponsible *abandon*, sweeping the dirt light-heartedly from one place to another, cutting themselves, spraining their ankles, breaking the furniture and calling continually on the Madonna, turning the morning's chores into a burlesque ballet and the smallest accident into a scene for grand opera; while we stood among them alien and helpless, uselessly remembering England.

Only gradually did individuals begin to

emerge from this phantasmagoria. The first I became aware of was Lina. Lina was billowing and ample, with curly black hair, and at the time of our arrival she managed single-handed the work of the Y.M.C.A. flat (which was constantly inhabited by six to ten people), doing all the cooking and the household washing into the bargain. Lina loved us and made nothing of the work, and the only price which one or two of us had to pay, was that of being prepared at any moment for an affectionate onslaught, for if Lina took a particular fancy to anyone, she would seize any reasonable or unreasonable opportunity of rushing in among us, flinging her arms round the victim's neck, and covering her face with kisses. It was Lina who provided for me one of the first of the paradoxical contradictions with which the Italians are so apt to confront one.

Having gone into the library at the club one morning to find the cleaning staff sitting in a pleasant circle round the radio, while the dust reposed unmolested upon the surrounding furniture, I had scolded them as severely as I could, with my limited vocabulary, and left them scowling and morose. I decided on my way home that it simply was impossible to get work out of the Italians, and that anyway they dislike us, and not without excuse. So I entered the flat in depression—to be set upon and fervently embraced by Lina, who had that morning made eight beds, cleaned the flat, cooked the dinner and done half a day's washing. It was some time before I learnt the secret, but eventually it dawned upon me that to get work from an Italian, you must make him (or her) personally attached to you. Once this is achieved, there is nothing he will not do to please you. But even then it does not do to expect the impossible. For it is hard indeed to alter the general assumption that the art of cleaning consists in the expert whisking of dust under furniture and down cracks; and neither this nor any other work can be done in Italy without an accompaniment of singing, shouting, clattering, laughing and crying, nor will it ever lose its element of the unexpected.

When we started concerts at the club, I began to know another stratum of Bari society. The musicians who came to play to us soon began to invite me to their houses, and

it was then that I first began to add to my treasure of friends some of the creative, sensitive artist-intellectuals through whom I was gradually to learn something of the true spirit of Italy. It was then that I first began to find Italian beauty. It was not striking, voluptuous beauty of colour or form. It was a fleeting grace of sensitive hands moving, the line of a forehead, the thinking droop of eyelids, the devoted, absorbed pose of a 'cellist gathered round his instrument. And I caught it in the vivid happiness of a young couple, one a violinist, the other a violist, as they played little light trios with a friend at the piano, and glanced at one another between the bars. Yes, they were my first friends, for it was not till many months had gone by that I met Renzo.

We had decided to start an art class at the club. So one day, buttressed by the education officer, I set out to find an Italian teacher. We were armed with an address in an out-of-bounds section of the town, which we found, and climbing a dark staircase, entered a curious jumble of a flat, and were directed into a large room, which seemed at first sight completely filled by paper and canvases covered with paintings and drawings, and by pencils, brushes, easels, a terra-cotta bust, a violin case, a stage for the model and a large earthenware pot filled with wild flowers. It was only after a moment that we turned and found beside the door a little bed, and in it a man, sitting up and painting an olive tree on a pad propped against his knee. Oh yes, he said at once, he was Renzo Baraldi; yes, he was a little ill, but it was *niente*; would we find something and sit down? I found a kind of stool, and the education officer, finding nothing, sat on the edge of the bed. We looked at Renzo. He was small and pale, and his hair grew upwards and curled in, like the petals of a dark chrysanthemum. His eyes were large and dark brown, and there was light behind them. It seemed that he was a war-time exile from Florence, and lived here with his two friends, a violinist and a farmer, whose land was now in German-occupied territory. No, he knew no English. Yes, he would be delighted to come and teach drawing to a class of English soldiers. So, somewhat dubiously, we engaged him to come the next week.

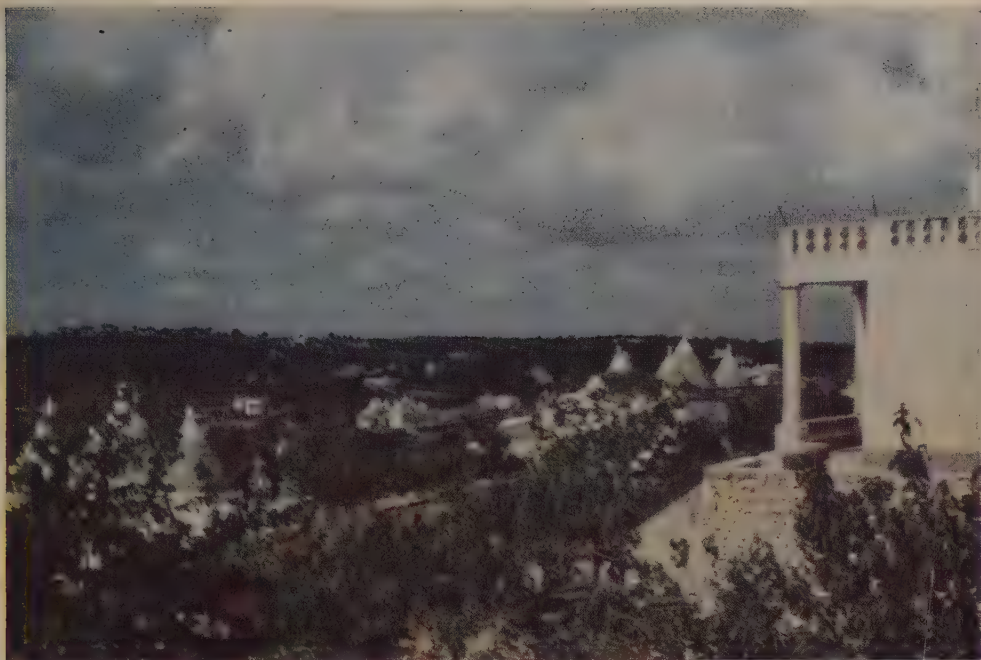
Next week he came. And within half an hour he had formed the desultory bunch of soldiers who had drifted in just to see what this new stunt amounted to, into the nucleus of a group of art students. For Renzo could teach. The class grew weekly. Many of the men could speak no Italian. Renzo, to the

end, spoke not a word of English. But with or without words, he taught. He taught men not just to draw, but to create. He evoked the living, receptive artist hidden under the layers of pedestrian Britishness. For art was alive in him. It burnt like a flame; it blossomed like a tree; there was no holding it. And the weak or strong creative impulse of everyone he met leapt to meet it.

Very soon there were people wishing for a modelling class, so Renzo and I drove out together to a pottery he knew of to buy clay. He sat beside me in the little Fiat, radiant, exulting in the colours of the country as we passed it, not in the obvious colour-contrasts that I saw: red earth, green root crops, blue olive trees, but in subtle, elusive shades: a grey stone wall turned purple by shadow, violet wood-smoke drawn like a veil across a cypress tree, leaves of the olives turned back in the wind and silver as water. That was one of the first days when I drew near for a fleeting moment to the heart of Italy. I was near it then, driving with Renzo, and still nearer when later I stood in the pottery, the little pottery which was as old as the village, and no one knew how old that was. I stood for a long while, forgetting time, and watched a young man throwing pots on his wheel. His fine, flexible hands worked on the obedient clay as unerringly as though the knowledge were in them; he seemed not to need to think, hardly even to look, but swiftly before my eyes the red mass grew into a simple, ageless pot-form, a form such as the Romans knew and the Greeks and the Etruscans, and forgotten civilizations dead before theirs were born.

The winter of 1944-5 was a bad one for the Bari people. They had too little food, few clothes and next to no heat. Day after day the sleet-laden east wind beat up the waters of the bleak Adriatic, and we would watch from the ill-fitting windows of our almost unheated club, the so numerous children of the frightfully poor running on bare feet through the wet snow. Even our stalwart Lina felt the bitterness and was ill for a time, and so at Christmas she was joined by a little round, rosy-faced helper.

It was Ada's first job with the British, and she was fascinated with us from the moment she saw us; we were as good as a play to her and much funnier. Very soon she was able to mime us all at will. Our Area Secretary who was by no means lean, and who had a distinctive way of walking, with his legs a good way behind him, and other portions of his anatomy surprisingly far in front, would occasionally catch sight of himself parading



Kodachrome photograph by R. S. Smythe

TRULLI AT ALBEROBELLO

into the dining-room in the person of Ada; and another member of the mess who would come into the room taking notice of no one, sit down and shout imperiously for his food, was even more delicious grist to her mill. It seems that I personally had a way of rushing through the flat in a great hurry, hitching up my slacks and buttoning my battle-dress blouse as I went, and Ada, although possessed of a quite contrary figure to mine, might occasionally be seen swinging through a room hitching up imaginary trousers in a manner which I understand was me to the life.

Ada came from a small town to the south called Alberobello. She constantly besought us to drive her down to visit it, so one day in the early spring, a party of us set out. The coastal country round Bari is flat, and derives its character largely from the violence of its colours, hot red, shrill green and the dusty olive-blue, set against a line of dazzling foam and the purple sea. The houses which stand among the olive trees are washed pink or white or yellow, flat-roofed, and built to look like huddles of different-sized boxes. The little towns as you come to them look light-coloured and fresh, but inside they are scarred with dirt and poverty. When you

have driven south for about an hour, the country begins to wave a little, the colours become more subtle, being varied by the effects of light and shade curving over hills, and the farm-houses take on a new character, for now they are built like clusters of oast-houses. They are washed white with grey stone roofs, and the ground plan is formed of a series of circles breaking into one another, while the roof is a clump of grey cones. This change in the country heralds the approach to Alberobello, and soon we come winding down our white road out of the hills and see the little town spread out below us, almost entirely built of these bee-hive dwellings, with a bee-hive church in the midst of them. As you stand and look down at this strange little town, it has the quality of a Walt Disney fantasy; but it is not a fantasy, it is a very ancient reality, for houses of this strange character have been built and re-built here since before the dawn of Italy's history. The Italians call them *trulli*, and no one knows whence the design of the trullo first came.

Quite as mysterious, I think, as the character of these houses is the character of the people who live in them. The southern

provinces are Italy's orphan child. They are desperately backward and poor. The lives of a great number of their people are permanently submerged in dirt and squalor. But here in the Alberobello country there is an island of wholly different life. The Alberobello people are brilliantly clean. They have little, but they have enough. The trulli within are neat and efficient; there is no waste and nothing lacking. The people live their healthy, ordered lives as if by some unconscious direction, which is wholly lacking in the Italy that surrounds them.

After I had been nine months in the strange south, I was sent to Rome. In Rome, as in the other cities of Italy, we lived shut up as tight as was possible in a military box; but the wonder of this greatest of European cities could not be excluded; it surged in through the swing doors of the officers' hotels; it sprang to life behind the intoning voices of the army guides; it shone in upon us over the sides of War Department transport.

In Rome I was cured of my prejudiced belief that a large town could never be anything but a blot splashed down upon the natural beauty of the landscape. For Rome rises as naturally and beautifully out of its surrounding country as a tree grows out of a field. I remember that this first dawned on me on the day when I hired a bicycle and set out to ride round the circle of the Roman wall. It was a hot day and we, for there were two of us, rode for about an hour along the outside of the wall, passing gates of many different periods, till we came to one small and modest, which we went through, finding on the other side a flourishing market garden nestling within the wall's curve; and as we were cooling our arms and faces at the spring which watered it, a gentle, brown-faced man came out of a small house and took us under his wing. He led us up to the top of a tower from which we could look out over his garden to the city on the one side, and on the other side to the country. And as we looked it dawned on us that one was not more beautiful than the other, only different, and Rome spread out before us was the natural outgrowth and consummation of the country which surrounded it. It was so obvious then that this ought to be the case with every town, that I wondered I had never realized it before; but struggling in through slums and suburbs to the centre of our own capital city, I never had. Our friend did not say much; he stood quiet beside us to let us look, and when we had seen, brought us down again, picked us a bunch of red rosebuds and let us go.

The only Roman I came to know well was a graduate of the university, only released from political imprisonment at the time of Italy's capitulation. When I met her she was attached to the British Army Education Corps, for the purpose of giving lectures on the Renaissance, which she did superbly. In the intervals of lecturing and taking batches of young women from the Y.W.C.A. on tours of Rome, she was occupied in devising a plan for international education and in organizing the 'League of Italian Women', which was to bear some part, she hoped, in the regeneration of Italy. I went to one of her meetings and watched with admiration her gallant struggle to lecture and persuade a feather-brained rout of Marchesas and Baronesses into some semblance of an organization. I can see her now, dressed in neat, unfashionable clothes, standing before them with her proud, nervous head held high and a little strained frown between her eyes; and seeing her, I see the desperate struggle of intelligent Italy, striving to raise the beginnings of a new national spirit out of the present slough of indifference and apathy.

My period in Italy was consummated with the gift of six weeks in Florence. Day after day, under the friendly guidance of a professor of fine arts, its treasures were displayed for us and we lived with Fra Angelico and Masaccio and Benozzo Gozzoli. And then, just to bring my wheel full circle, who should run up to me in the street one day but Renzo, Renzo radiant, newly returned from his exile in Bari, and rich in the possession of a fresh Florentine attic and a consignment of paints from America! So away I went with him to see the work of himself and his young contemporaries; and fine living work it was, honest and vital, made of the stuff of the 20th century, but like all else which lives and grows, rooted in the past.

So my discovery of Italians ended where it began: with the artists. The basic character of England, I believe, is carried by the working people—by the gardeners and garage hands and carpenters and the man who comes to mend the sink. In Italy the artists carry it, all the artists scattered through the country's life: the artists in painting and music, the artists in writing and thinking and speaking, the artists who make pottery for the villages, those who make boxes and chests and books, those who farm the land, ploughing and planting and pruning with a sense of infallible beauty. It is on this fine, elusive thread that the living spirit of the country has been carried, through all the disruptions of its passionate history.

Sketches in Campania

Paintings by FRANK BOWMAN

Notes by ARCHIBALD COLQUHOUN



NEAR RAVELLO

THE little ports dotted around the Bays of Naples and Salerno still have an extraordinary charm. Fishing-boats and wine-carrying schooners are drawn up on the shore as they were before the Phoenicians arrived. Baia, the Biarritz of the Roman Empire, is only a quiet little place now where the steamer puts in from Ischia. When the water is clear great slabs of masonry can still be seen, where the Imperial Roman villas, their piers once garlanded with roses, have decayed and fallen into the sea.

Further south, round the corner of the headland from Capri, the Amalfi coast is, by contrast, tumultuous and exotic. The little ports there, Positano, Amalfi, Maiori, Cetara, Vietri, are tucked in under soaring peaks where Polyphemus once sat and watched Odysseus pass. From the sea the white-arched houses and glittering tiled domes of the villages high up among the terraced vineyards look as if they are clinging to the pre-

cipitous cliffs. Each little port is a capital to the peasants scattered above it on those improbable slopes: until well on in the last century those parts were only accessible by sea.

The sea and the beaches are still the centre of local life, now reduced mainly to fishing and boat-building. By sea the Republic of Amalfi built up its power, and by a tidal wave it was destroyed. Each peak and headland is crowned with a Norman tower, built to protect the ports from the Arab pirates who raided these parts regularly between the 7th and 14th centuries. Oriental influence in the local architecture and customs is strong. Up at Ravello the summer palaces of the merchant princes of the Republic have Arab and Saracenic courtyards; often classic columns among the trellis-work recall an earlier occupation. At sunset, when towers and headlands, terraces and peaks, merge with the sea in a golden mist, like some fantasy by Turner, it seems that here nature and history have come to terms.

BAIA





CETARA

VIETRI



The Landscape Clothed

by PROFESSOR E. G. R. TAYLOR

This is the second of three articles (the first appeared in our August number) in which Professor Taylor brings a far-ranging geographical eye to bear on many features of the earth's landscape: its rocky anatomy, its natural clothing, and its transformation by the various activities of man

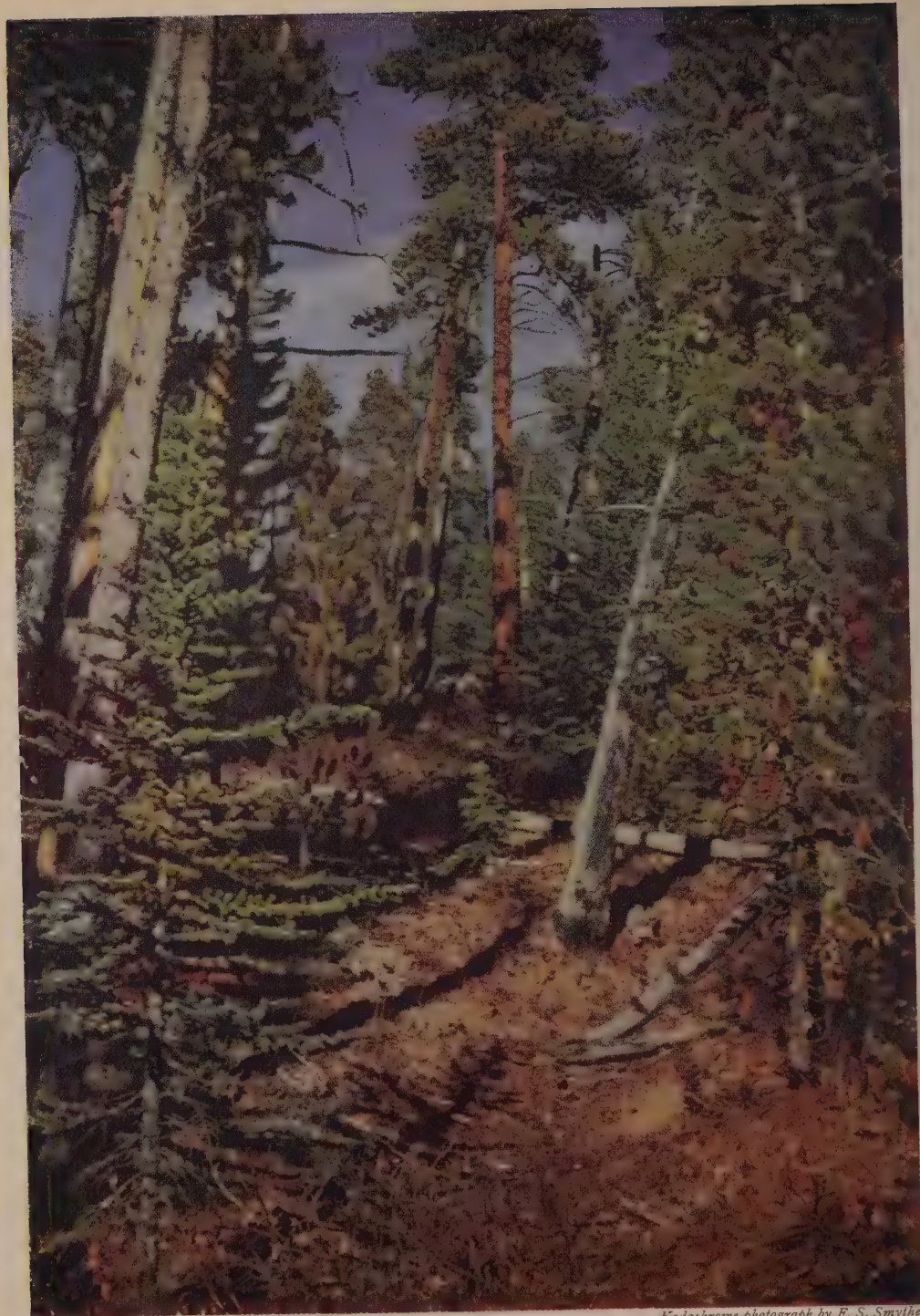
THE sight of naked rocks, save along the sea-shore, is to most of us as rare as the sight of a naked torso. That is partly because bare rocks afford no livelihood, and so their neighbourhood is shunned by mankind. But this is not the whole answer. No sooner is a surface of rock exposed to the air and the rain than it becomes subject to that fretting, crumbling and wearing-away that is termed weathering. Unless there is some agency at hand to carry away the particles, flakes and fragments detached, these accumulate through the centuries until the parent rock becomes mantled and muffled more and more deeply beneath its own débris. It is this rock waste that constitutes the bulk of the soil, and where there is soil there is likely also to be a further green mantle composed of vegetation—the plant cover. Thus the landscape, as we normally see it, does not display that anatomy which was described in an earlier article. It is doubly clothed.

Not all soil, of course, remains 'in place' (as the geologists term it), that is to say merely resting on the parent rock. The rain washes it downhill; the wind sweeps it forward and lifts it up to carry it far away; majestic glaciers bear it along for hundreds of miles, depositing it at last round about their snouts in vast moraines. Where soil is actually on the move, no plants can lodge and grow. Mountaineers are familiar with the slipping, sliding 'scree' made of loose rock fragments which are found at the foot of perpendicular cliffs. Blowing sand dunes, shifting river gravels, the shingle and sand swept to and fro along the seashore, all these remain barren and bare. But where even a pinch of soil is at rest it offers a lodgement for seeds and spores, from which plants spring, and these gradually enrich it with humus, the product of their own annual decay. All city dwellers have noted with delight how the unsightly heaps of building stones, concrete, bricks, plaster and mortar which were blitzed into dust and rubble have spontaneously become wild gardens of singular beauty.

Wherever plant life appears, there animal life follows—from the invisible bacteria up

through the all-important worms, the snails, the insects, the birds and four-footed beasts, and so to man himself. These animals in their turn transform the soil, some directly, like the bacteria and the burrowing worms, some indirectly, merely by the addition of organic waste, others at second hand by their selective feeding habits which in time alter the character of the plant cover. We have all seen a sward completely transformed by the nibbling of rabbits, and some of us have heard, for example, how the once lovely forests of St Helena, a solitary Atlantic island, were completely destroyed by the browsing of wild goats, the progeny of animals landed centuries ago by the Portuguese to supply the crews of their East Indian fleets. What is less familiar is that such alterations of the vegetation do in fact transform the soil. For the whole texture and fertility of the soil depend upon the admixture of organic matter from decaying roots and leaves. Obviously then, if a leafy forest disappears, the rich leaf-mould formed underneath it disappears likewise. And if forests growing on hillsides are destroyed the soil may be totally swept away, for the tree-roots which held it in place and regulated the run-off of the rain, will gradually decay and disappear.

The story of how the soil is transformed by the kinds of plants and animals associated with it is an intricate one. Equally complex is the story of how the character of the soil may, in its turn, demand a transformation or adaptation of structure and habits from animals and plants. The most obvious example is where, for topographical reasons, the surplus soil water cannot drain away, and the ground becomes waterlogged. A marsh, swamp or bog is the result. Plants growing there must adopt a lush habit, since it is from leaf surfaces that they get rid of superfluous moisture, whilst animals must swim, or wade or wallow rather than run. At the other end of the scale, where soil moisture is over-scanty, the plants respond by reducing their leaves to mere spines and thorns, or by developing fleshy water-holding leaves, and stems as reservoirs. Any large animals



Kodachrome photograph by R. S. Smythe

choosing a dry habitat must be swift of movement if they are to survive, for they must travel widely for food and water.

Most extensive tracts of dry soil, apart from stretches of wind-blown sand derived from the sea-shore, owe their character to the local lack of rainfall. The idea that trees make rain, and that a desert is dry because it has no trees and plants, is one that dies hard. It was the accepted notion as late as the 17th century, when educated men speculated as to the nature of the calamity which had destroyed the vegetation of the great Sahara, and so created the desert. It was in the 17th century also, however, although very near its close, that a real advance towards scientific geographical knowledge was made. That great English genius, Edmund Halley, best known perhaps as an astronomer, was able to build up from the reports of seamen an ordered world picture of the major wind-systems of the globe, and to perceive them as a necessary consequence of the thermal circulation of the atmosphere between equator and poles. He thus paved the way for an understanding of the distribution of rainfall and types of vegetation.

Since the winds are systematic (even where they are systematically variable), the rainfall over the globe is also systematic, that is to say that it conforms to a pattern. And because in broad terms the rainfall decides the general characteristics of the plant cover developing on the soil, a world map of natural vegetation displays the same general pattern as one of average rainfall. This point is clearly brought out by the pair of maps given on page 206. But not until the beginning of the 19th century was the world well enough travelled by men of scientific habit of mind for it to be realized that forests, steppes and deserts do not occur at random or by accident, but conform instead to the normal conditions of temperature and rainfall. Once this fact was realized, with all that it implied concerning the conditions of human life, modern geography may be said to have been born.

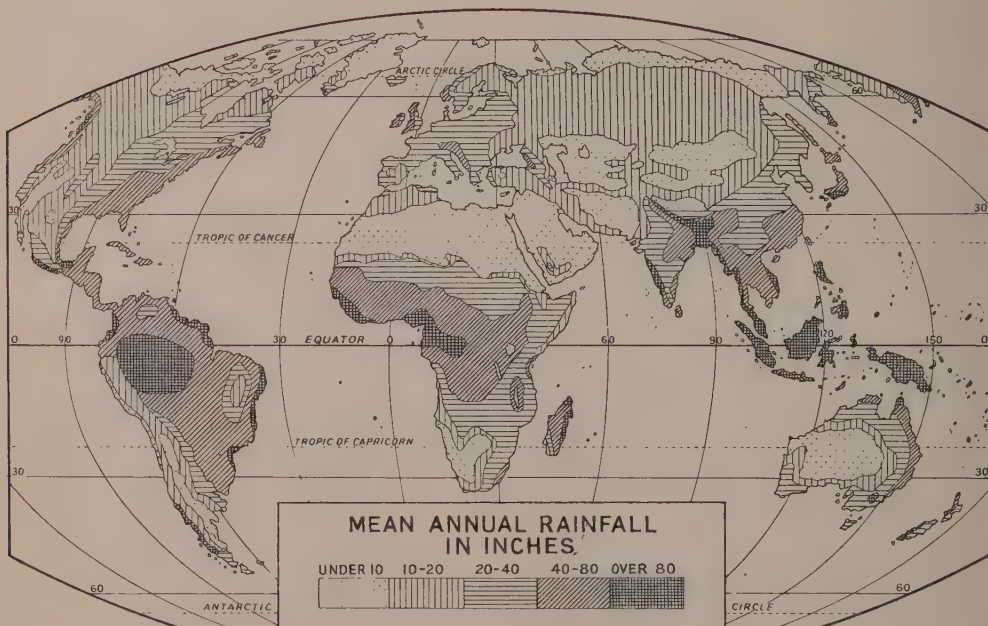
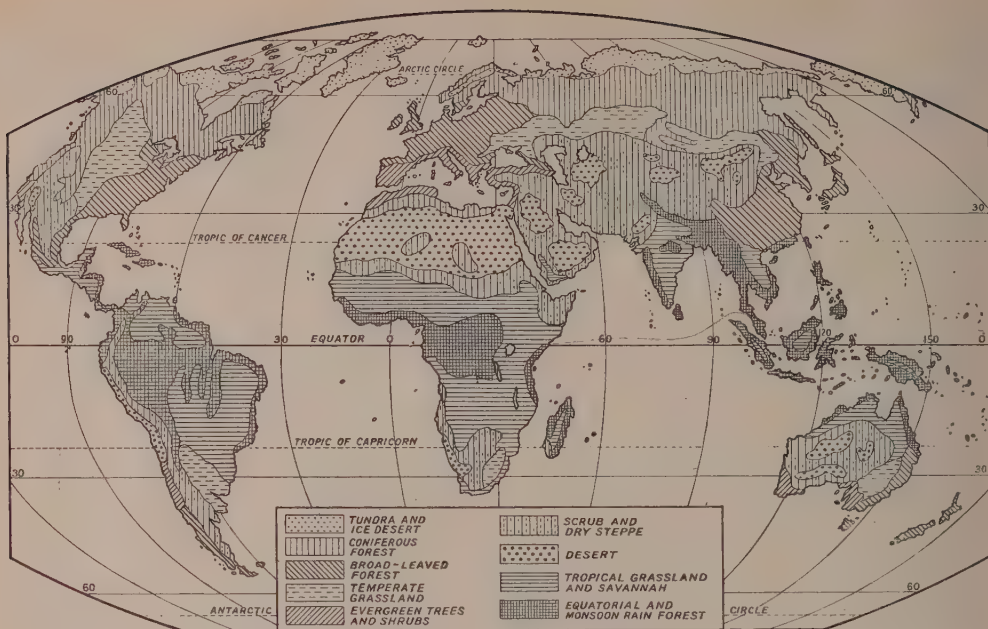
It required a capacity to take world views to arrive at these fundamental truths, for as has already been shown, there may be complex modifications of soil and plant cover, together with the accompanying animal life,

which are merely due to local topographic and geological conditions. It is one of the merits of the geographical map that, once we plot down upon it our detailed observations, it brings out regularities and similarities which may point the way to the 'reason why'.

Before taking such a bird's-eye view of the plant life of the globe, the reminder is perhaps necessary (although not to gardeners) that the season at which rain falls is just as important as the quantity. Within the tropics the rain "follows the sun", as they say, with the result that as we move away from the equator in either direction, the dry period of the year, at first almost negligible, gets longer and longer until by the time the Tropics of Cancer and Capricorn are reached it is lasting all the year round, and such rains as do occur are unpredictable, rare and erratic. It must be understood of course that once the equatorial belt is left, the dry season on one side of the equator is the wet season on the other, and vice versa. Where dry weather only lasts a few weeks at a time, or where the tropical downpours are so heavy that the soil remains moist long after they are over, we find the steamy, gloomy, tangled rain-forest. Here the atmosphere is that of the palm-house at Kew Gardens, and it is here that palm trees of all shapes and sizes flourish, while a tangle of vines and creepers, parasitic plants and luxuriant undergrowth bars the traveller's path. The dense canopy of leaves developed perhaps sixty or a hundred feet above ground-level, and providing an endless variety of fruits and nuts and seeds, makes tree dwelling an obvious manner of life. Bats, butterflies, beetles and birds, monkeys and great apes, tree-frogs, tree-snakes, tree-rats, and wild-cats of every breed, can live out their lives without any real need to touch the ground.

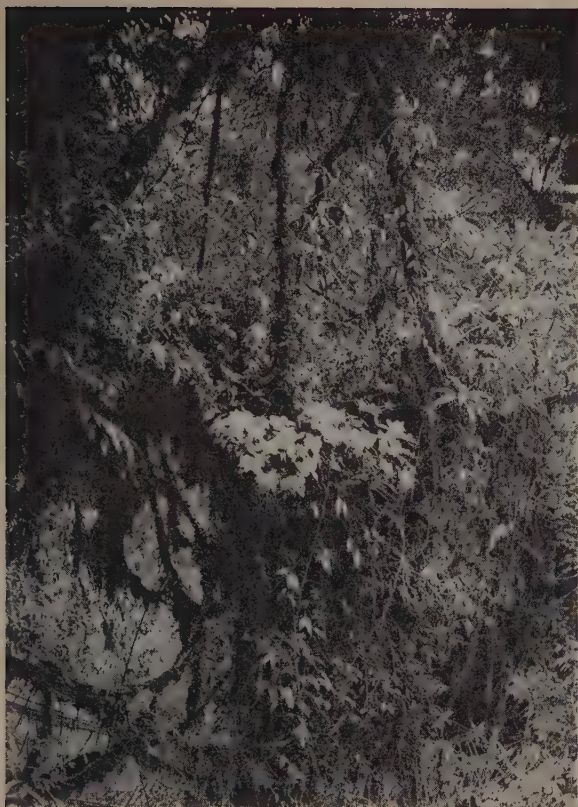
Where the dry season lengthens the forest opens out, and tall grasses take possession of the soil, for although they must wither away and die in the prolonged drought they can spring up again fresh and green with the first rains of the new summer. Such trees as refuse to be daunted, like the giant African baobab and the many varieties of acacia must either shed their leaves and rest when the soil refuses water, or must confine themselves to the neighbourhood of water-courses, or of mountain-slopes and seaboard that

"This is the forest primaeval"—a Canadian scene, amid the great northern belt of conifers. Unhelped and unhindered by man, the trees struggle among themselves for living-space, and match themselves against lightning, gale and blizzard. The oldest have fallen, the ageing are no longer upright, but sheltered by its forebears the young spruce in the foreground is showing sturdy growth



Stanford, London

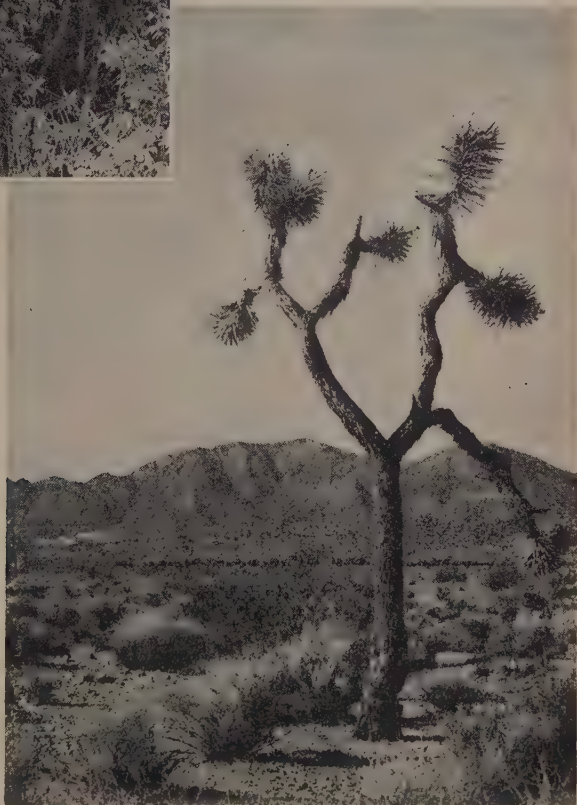
Two maps showing clearly the way in which luxuriance of vegetation depends upon moisture. By running an eye along latitude 30° we can note the heavy rainfall of north-east India and the scanty rainfall of the western United States which account for the contrasts between the two pictures opposite



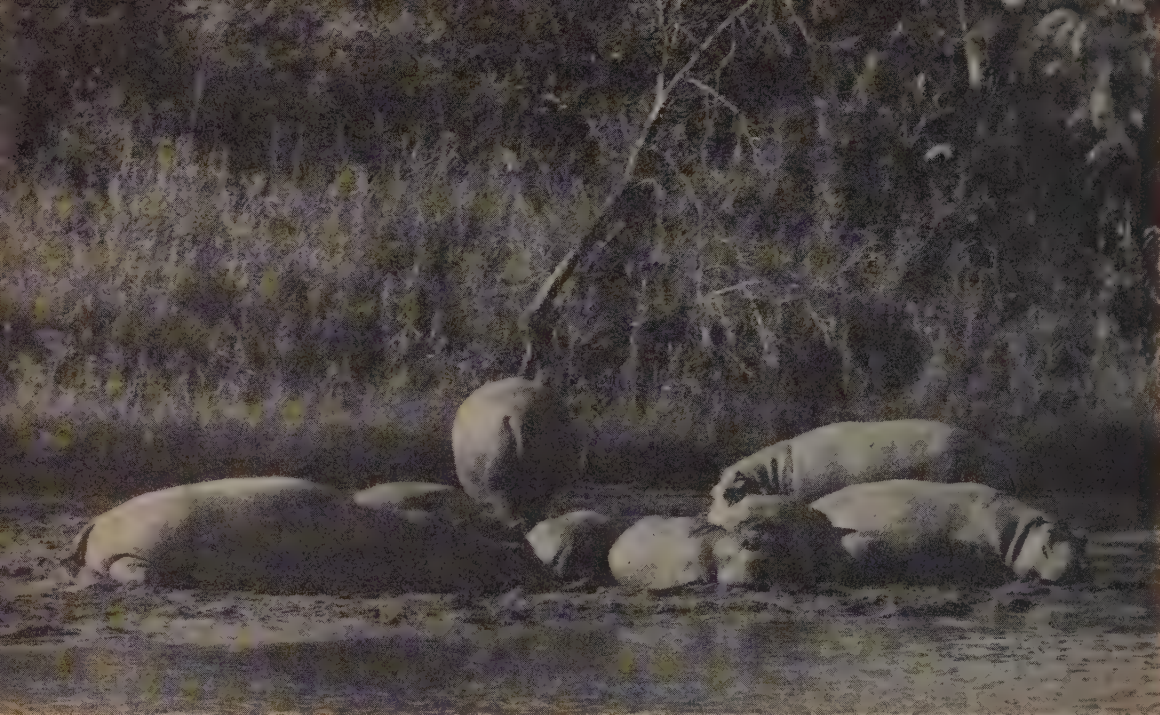
F. Kingdon Ward from Paul Popper

This flowering shrub is an 'epiphyte'—a plant growing upon another plant, and not rooted in the ground. In the tangled tropical rain-forest there is keen competition for space. The successful must support not only epiphytes but rope-like creepers

The stony soil, the scrubby small-leaved bushes, the grotesque spiny tree, all spell aridity. But the rare rains are downpours that strip off the naked rock's last clothing, as the bare, deeply scored face of the distant mountains amply proves



U.S. Forest Service



Paul Popper

Abundant water means luxuriant life, at least in the tropics, not only of aquatic plants, but of vegetation beside the pool or river. With plentiful green-stuff these huge, corpulent hippopotami, though herbivorous, can afford to wallow in the mud and do not need to be built for speed like—

catch some extra rainfall. These tropical grasslands, the savannahs of Africa, the campos of Brazil, the llanos of Venezuela, are the world's big-game countries—a paradise for animals that live on herbage, and (in their turn) for the predatory animals that live on game. Antelopes and buck, elephants, zebras and giraffes, lions, leopards, jackals and hyaenas, these are only the most conspicuous of the fauna of the African savannahs. But they are destined only to survive in so far as their lives are preserved by game-wardens.

Wherever the tropical dry season occupies more than half the year the tall elephant grasses and bamboos of the park-like savannahs yield place to shorter grasses, while tough little shrubs and thorns replace the trees. As the rains become shorter and shorter, even this poor vegetation becomes more sparse, but it never disappears completely even in the so-called deserts. Seeds lie dormant in the dust, and a single shower brings a flush of green. Desert hares and desert rats, some of the smaller antelopes, and running birds like the ostrich can pick up a livelihood where to the careless eye the landscape appears quite bare.

Once the desert is crossed by the traveller

moving away from the equator a regular rainy season begins again, but this time in the winter. Summer is now the season of drought, lasting usually, however, not more than three or four months. Even so, it sets a new problem in the plant world. Grasses and tender shrubs can flourish only in the winter months (which are fortunately very mild), and after a brilliant flowering in the spring at the time of the 'latter rains', they wither and die. This 'summer dry' climate is the rule in Palestine and all round the Mediterranean Sea, occurring too in corresponding latitudes in South Africa, Australia and the Americas. Many of the indigenous trees guard against loss of precious moisture by developing very thick-skinned leaves, and it is this that gives their dull-green colour to ilex and wild olive and laurel. Some smaller shrubs and herbs secrete essential oils, which apparently serves the same purpose, so that a host of sweet scents arise as we trample the thyme and marjoram and lavender on some hillside in Greece or Dalmatia.

This 'Mediterranean climate' as it is called, occurring broadly between latitudes 30° and 40° (although it is absent on the east coasts of the continents), introduces us to a



By courtesy of South African Railways and Harbours

—the lean, elegant giraffes, which inhabit thinly wooded open savannah or 'bush' in South and East Africa and, in the dry season, find very spare browsing among the branches of its deciduous trees. Their dappled necks provide a natural camouflage in this landscape of dappled light and shadows

kind of weather that is quite foreign to the tropics. It is weather that can only occur where it is normal to encounter masses of very cold air. Such air masses are generated at the poles all the year round, as well as over the northern continents during the winter months. Their weight causes them to spread out from their place of origin, and wherever they come up sharply against advancing masses of warm moist air, storms of wind and rain result. Between latitudes 40° and 60° on both sides of the equator, such rainy weather is likely at all times of the year, and the plant cover takes the form of temperate forests. Less than two thousand years ago our own country and most of Europe was clothed with forests of oak and hornbeam, beech and chestnut, through which ran the deer and the wild boar, the wolf and the wild ox. In America such forests (although the individual trees were different) met the eyes of the first settlers, from the Carolinas to New England, but in the southern hemisphere they are represented chiefly in Tasmania, Southern Chile and New Zealand, since the belt between 40° and 60° South is almost entirely ocean.

But the temperate forests never clothed the

whole of the continents, although their former limits are still a matter of dispute. It is a general rule that rainfall diminishes with increasing distance from the sea, and there comes a point when the rainfall is sufficiently low or uncertain to tip the scales in favour of the grasses and herbaceous plants in the struggle for *Lebensraum*. No doubt mankind, as a forest-destroying species, lent a hand in securing the result that we see today. The American pioneers moving towards the Ohio and Mississippi emerged from the forests to discover the prairies and the treeless High Plains. These are the counterparts of the steppes of Europe and Asia which extend from Hungary to the confines of China. With ever-diminishing rainfall the flower-studded grass steppes pass over into meagre scrub or even desert, but the point of greatest importance is that, like the savannahs, they afforded an ideal home for grazing animals. In the New World the untamable bison was accompanied by species of deer, and harried by wolf and coyote. In the Old World, pursued likewise by beasts of prey, were the ancestors of our most precious domestic animals, horse and ass and camel, as well as sheep and goat. The man who first tamed and bestrode a



Black Star

How much this European beechwood owes to human care, it is hard to say: forestry is centuries old. But the absence of undergrowth, the scantiness of lower branches and the pillared ranks of trunks are typical of beech-forest

horse made history as surely as the Wright brothers!

Closing in both temperate forests and steppes towards the north, we find the immense coniferous forests which form our main timber reserves of 'soft-woods' today. Stretching from ocean to ocean, from British Columbia to Newfoundland, and again from Norway to Kamchatka, the sturdy conifers, larch and fir and pine, represent a response to the challenge of prolonged winter cold and a heavy burden of snow. Within their shelter live many animals which meet the same challenge by provision of a winter coat of thick and fine fur. Sable, marten, ermine, squirrel, fox, mink, lynx, bear—the list of

their names is a long one, and their destiny sad! Some of these forest-dwellers move out into the open in summer-time, for the forest thins out polewards into the tundra, a region which comes to vivid life for the few brief weeks during which the sun scarcely sets. 'Tundra' is the European name for the treeless, boggy plains, like rather desolate moorlands, which form a ring round the Arctic Ocean. The Canadians call them Barren Lands. They afford grazing for caribou and reindeer, their berries feed grouse and partridges, their herbs the Arctic hare, and these in turn the stoat and the fox. The explorer Stefánsson declares that their monotony is often broken by lovely emerald-green meadows vieing in the brilliance of their flowers with the famous Alpine meadows of the Tyrol. The herds of grazing musk-ox, he believes, which are hardly ever glimpsed by mankind, might be developed to afford us a new meat supply.

However that may be, it is no matter of surprise that Arctic and Alpine flora should match one another. The diminishing temperatures from equator to pole match those from the base of a mountain to its summit, and matching sequences of vegetation belts are the consequence. Between the equatorial forest and the tundra there is a distance of 5000 miles, but between the tiger-infested jungle and the gentian-studded meadows at the base and near the summits of the Himalayas is less than five. The famous botanist Joseph Hooker viewed these zones and climbed up and down amidst them just under a century ago. First, as he described it, came the *sal* forest, with palms and plantains, and giant bamboos a hundred feet high. At 4000 feet or so, flowering magnolias and tree-ferns and laurel appeared, and as the tropical species vanished, magnificent oaks dominated the forest, increasingly accompanied as he climbed higher by chestnut, maple, holly and other familiar European trees. By about 9000 feet the coniferous trees, at first few, had become dominant, pines and firs, larches, cedars and yews. At still greater heights these forest trees became more and more stunted and gradually disappeared. Rhododendron bushes, dwarf juniper and honeysuckle grew amidst meadows of startling green, brightened by cowslips, buttercups, pink campions, purple asters and blue gentians. Above the meadows, at 15,000 feet or more, were the snowfields, and the bare sheer rocks, the landscape unclothed!

Perpetual snow as a ground cover continues to hide hundreds of thousands of square

Up the steep mountain-sides climb the dark forests of larch and fir, to end almost abruptly at the tree-line. Lovely Alpine meadows take possession of gentler slopes on mountain shoulders and valley floor

Within all types of forest natural clearings are often found where the ground is too waterlogged for trees. In such spots water-meadows, merging into bog and pool, afford rich pasture for beasts of the forest, such as (below) the American bull moose



E. Meerhän

William L. F.

miles of the earth's crust from human inquisitiveness, and from invasion by plants. But the Polar Regions provide us with a great botanical puzzle. In a sea-cliff in Spitzbergen, far within the Arctic Circle, thick seams of coal can be seen. Now coal (so we are told) represents the remains of vast swamp forests, which grew under warm and humid conditions tens of millions of years ago. How could there ever have been such a climate where today only the snow-blizzard disturbs the still icy air? Is it true that the earth's crust is like a loose skin that can be slipped into new positions over the massive core of the globe? Spitzbergen, perhaps, has only slowly wandered northward in geological time. However, since the world is sixteen hundred million years old, and has been subjected to scientific scrutiny for less than two centuries, some unsolved puzzles must be expected. Not the least of the difficulties to be faced is that man himself defaces the earth's surface and so destroys the records. Like any other animal he, by his mere way of life, transforms the soil and alters the entire character of the vegetation. And he has by now been an element of the landscape for about a million years. To understand the present-day landscape we must next examine it, therefore, as a *Landscape with Figures*.



The Diffusion of Greek Culture

V. Greece and the early Mediaeval West

by H. St L. B. MOSS

In our April number Dr Sutherland described the movement of Greek influence westwards during the great days of Rome. Mr Moss, author of The Birth of the Middle Ages, continues the story through the barbarian invasions, which sundered the Mediterranean world and set western Europe on new paths

GREEK influence on western Europe during the so-called "Dark Ages" is almost a case of *lucus a non lucendo*. For in contrast with the centuries which preceded and followed, it is the decline, and in some respects the extinction, of Greek influence in the West which characterizes this period. Influence there certainly was, but exercised for the most part indirectly, and in spheres where exact appraisal is seldom possible. Much in the history of the Dark Ages is still dark, much is still matter for dispute, and generalization is therefore peculiarly hazardous. Sources are scanty and difficult to interpret—it is not always realized, what an important factor in the real understanding of a period is the literary quality of the primary authorities.

Contemporary writers with the skill to express their thoughts, with a curiosity about human character and motives, and a desire to get at the true significance of the events they chronicle, give us clues which can never be adequately replaced by the findings of archaeology. Excavation can tell us what tools were used, but not what sort of people they were who used them. Religious symbols may seem to give us a deeper insight into the thought of a period; but when checked by literary texts they often turn out to mean something quite different from what we should expect. Now writers of first-class quality are singularly lacking in the West during these centuries; the disturbed conditions of the time are reflected both in the



decline of literary standards and in the limited horizons of the writers themselves. As for the East,' the comparative ignorance of Byzantine authors about what was happening in north-west Europe is only one more indication of the break-up of the physical unity of the Graeco-Roman world, which followed the barbarian invasions of the 5th century.

As previous articles have shown, this unity of the Roman Empire was very real. To most of its subjects the Empire represented the *oikoumené*, the 'inhabited world', and Roman rule was to them the only conceivable order of government. Hence the immense shock when Rome fell to the Visigoths in A.D. 410—a shock which prompted Augustine to explain the catastrophe in Christian terms by writing his masterpiece, *The City of God*. Hence, too, the enormous prestige accorded in the West to Byzantium, or New Rome, during the three centuries that followed, as the surviving, legitimate centre of that Empire, whose western provinces had succumbed to the barbarians.

During the great days of Rome, from end to end of her dominions ran a continuous system of communications, stretching from Scotland to Mesopotamia, from the Low Countries to the Red Sea, and along it circulated a long-distance traffic in mass-produced household commodities, together with a stream of tourists, business men and government officials. Bringing with it influences from every quarter of the Empire, this flow of traffic along the Mediterranean and up the great roads and rivers of western and southern Europe continued, though much diminished in volume, into the 5th century, despite growing self-sufficiency on the part of certain provinces, such as Britain and Gaul, and notwithstanding the gradual transformation, under pressure of circumstances, of the free commercial enterprise of the earlier Empire into a system of what has been called State socialism, with public control of essential industries and transport, to enable them to meet, in an age of disorder and inflation, the desperate needs of the civil service and the armed forces. It must not be forgotten, too, that Latin culture was itself permeated with Hellenism. The educated Roman, as Dr Sutherland has pointed out, was bilingual,



Alinari

The Empress Theodora and her suite: part of a contemporary mosaic at Ravenna depicting the court of Justinian the Great (A.D. 527-65). Scenes like these enhanced, for the Northerner, the romance which surrounded Byzantium—Micklegarth, as he called it, the Great City

and Greek philosophy, literature and art were his acknowledged models.

Nevertheless, it is true to say that the Empire had always consisted of two halves, corresponding roughly to the eastern and western basins of the Mediterranean, with their respective hinterlands. Under Roman administration, the two cultures had fused in a remarkable way, so that it is justifiable to speak of a Graeco-Roman civilization. Yet certain differences always remained. If the West, for example, learned to speak Greek, the East never learned to speak Latin. The East was the seat of far older civilizations than Rome, which could, and did, look down on the upstart conqueror. Despite a formidable apparatus of propaganda—court poets and

historians, coin imagery and legends, Imperial pronouncements, speeches and panegyrics, official and unofficial—employed with the set purpose of spreading the Roman ideals, an obstinate resistance was offered in many quarters to the Roman 'way of life'.

The East, too, was the home of the great cities, with which western Europe, with the exception of Rome herself and perhaps Carthage, had nothing to compare. Under the successors of Alexander the Great, political and economic organization, banking, commerce and industry in the Aegean world had already reached a high degree of complexity. In the West, Roman civilization, a comparatively new growth in many regions, thinned out as it departed further from the Mediterranean; and the economic preponderance of the East became more marked with the agricultural decline of the Italian peninsula, and the chaotic conditions which prevailed during much of the 3rd century.

The shifting of the centre of gravity, political as well as economic, was acknowledged in 330 by the foundation of Constantinople as the New Rome, twin capital of the reconstituted Empire as it emerged from the reforms of Diocletian and Constantine. Less than a century later, the interests of East and West had begun to diverge. The Empire was now threatened on all sides by the barbarian invaders. The lower Danube and the Euphrates frontiers had held firm, but the Rhine barrier had fallen, and Italy herself was overrun. Within a few generations, Germanic rulers, most of them owing nominal loyalty to the Emperor, had carved up the Western provinces into separate kingdoms. The Vandals, passing rapidly through France and Spain, had settled in north-west Africa, and from this strategic centre their sea-power dominated the Mediterranean. Regular sailings from the Eastern ports were now at an end; traffic was diverted to the perilous overland routes, which not long afterwards became impassable when Slav migrations, spreading into the Balkan peninsula, interposed a barbarian *bloc* between the East Roman Empire and its former provinces in western Europe. Such trade as continued to exist was very different from what it had been under the early Empire. It was mainly a trade in luxuries—vessels of gold and silver, embroidered silks, spices, pepper and incense, MSS and *objets d'art* for the kings, bishops and monasteries of the Western world. The commercial system created during the previous centuries had been destroyed, and with it the long-distance exchange of commodities for everyday use.

The prosperous, cultured middle-class in

the West, which had produced Jerome in Dalmatia and Augustine in North Africa, was disappearing, and with the breakdown of law and order all the apparatus of civilized life—schools, universities, law-courts and municipal institutions—was becoming a thing of the past. Knowledge of Greek had long been declining. Exactly why and when the change came is not known; but from at least the 4th century, Roman acquaintance with Greek thought rested principally on translations. From the circle of renowned Hellenists at Rome whom Macrobius describes in his *Saturnalia* (c. 395) we gain an idea of the state of learning at this time. Deep interest is shown in the relations between the two languages; pagan Greek culture in all its aspects is intensely studied. But it is not classical Hellenism, nor is it, for the most part, at first-hand. Greek and Latin grammarians, compilers, commentators and Neoplatonic interpreters, Porphyry in particular, have predigested the material. The debt to Porphyry or his translators, and to Latin handbooks of Greek learning, is seen also a few years later in the writings of Jerome and Augustine. Jerome, though thoroughly versed in current Greek theology, steeped in Greek idiom and vocabulary, and resident for much of his life in the Greek-speaking East, gives little real evidence of direct acquaintance with the Greek writers of the 5th and 4th centuries B.C., even Plato and Aristotle; while Augustine, confined to the West, seems only in his old age to have attained an effective mastery of the Greek language.

After the fall of Rome in 410, Greek studies in Italy appear to have suffered a further decline; in Africa, the fall of Carthage to the Vandals (439) produced a similar result. In southern Gaul, Hellenism still lingered on, and a remarkable group of *complotonici*, enthusiasts for Platonism—or rather, Neoplatonism—is revealed in the writings of Sidonius Apollinaris (c. 470). Mention must also be made of Lérins off the coast of Provence, the principal centre of monastic culture, from which the ascetic literature and rule of life of the Thebaid fathers were disseminated in the West. Cassian, its founder, had himself, it may be noticed, sojourned in Egypt. But with the ascendancy of Clovis and the Franks in the early 6th century the prestige of Byzantium received a setback, and Avitus of Vienne, the representative in the next generation of the aristocratic circle of Sidonius, speaks scornfully of the schismatic Greeks, their lying poetry and their turgid philosophy. Gregory of Tours (c. 538–94) knows no Greek; and though emissaries and pilgrims occasionally

visited the East, bringing back news of current events and relics and legends from the holy places, Merovingian France was, in effect, insulated from the Greek world. Even the theological disputes of the Eastern churches had become barely comprehensible to most Western clerics, who lacked the philosophical background necessary for their understanding.

Under the enlightened rule of Theodoric, the Ostrogoth ruler of Italy (493-526), a final and very remarkable attempt was made to raise the level of Western education by recourse to the wellsprings of Hellas. Once more it was from the cosmopolitan circle of the old Roman nobility that the movement came. Boethius, with the support of his

father-in-law Symmachus, planned an ambitious scheme to make available in Latin translations and commentaries the whole range of contemporary Greek learning. Works on arithmetic, music, geometry and astronomy were to be translated first; then the logic, ethics and physics of Aristotle, and all the dialogues of Plato. Finally, an attempt would be made to demonstrate, not the differences, but the fundamental unity underlying the thought of these two philosophers.

Boethius died at the age of forty-four, executed by order of Theodoric on a charge of treason. Only a fraction of his work had been completed; but his translation was to be the chief source of Aristotelian logic for the



Victoria and Albert Museum, Crown Copyright

Influences of Mediterranean origin in Anglo-Saxon art appear in the vine-scroll on the 9th-century Easby Cross and in the representational and plastic quality of the figures of Christ and the Magdalen on the Ruthwell Cross (c. A.D. 700). This quality contrasts strongly with the surface ornament and abstract design of native tradition



The Warburg Institute



St Matthew: from the Irish Book of Kells. c. A.D. 800



St John: from the Lindisfarne Gospels. c. A.D. 700



St Matthew: from a Carolingian Gospel-book. 9th century



St Luke: from a Byzantine Gospel-book. 10th century

(Opposite) In the hands of Northern artists the figure subjects of Mediterranean book-illuminators become part of an elaborate formal pattern. The Celtic St Matthew is built into the surrounding decoration; the Northumbrian St John is ornamentally suspended in space; the Rhenish St Matthew is more at ease; while the Byzantine St Luke preserves, after almost 1000 years, the classical impressionist tradition. (Compare p. 505 of April number.)

(Right) A wall-painting at Canterbury of St Paul and the viper (12th century) is strikingly similar in treatment to a mosaic at Palermo in Sicily, where connections with Byzantium were especially close



By courtesy of Professor E. W. Tristram and O.U.P.

mediaeval West, while his famous *De Consolatione Philosophiae*, with its Neoplatonist influences, which was translated into English by King Alfred, may be called the favourite book of the Middle Ages. Theodoric's suspicions, whether well-founded or not, broke the connection which had been established between Italian scholars and the seats of learning at Constantinople and perhaps Alexandria; and there was to be no genuine revival of Greek studies for many centuries to come. Cassiodorus, half a century later, in his monastic community at Squillace in South Italy, devised a comprehensive educational programme, in which room was found for the liberal arts as aids to the interpretation of the Scriptures. What may be called the *catalogue raisonné* of his library, which can roughly be reconstructed from the *Institutiones*, indicates that in some subjects, natural science in particular, Greek manuals were indispensable. But Greek manuscripts were few, and evidently difficult to come by. It is clear, moreover, that not many of the monks were capable of profiting by them.

The reconquest of Italy by Justinian made it a Byzantine province. Greek influence was dominant both at Ravenna and Rome, and a subsequent influx of refugees during the Iconoclast persecution in the East added to

the Greek element in the peninsula. South Italy and Sicily, too, remained Greek in character long after the intervention of the Frankish rulers had removed the dependence of the Papacy on Byzantine arms.

During the whole of the Middle Ages, the one cosmopolitan influence was of course the Church. The first Christian communities in Rome were Greek-speaking; for the first two centuries of their existence Greek was the liturgical language of the Western churches. The earliest Christian writings in the West were in Greek, and it was only late in the 2nd century that Christian Latin literature may be said to have begun with Tertullian. Most of the great controversies which divided the Christian world arose in the East; and the terminology of Christian doctrine was based on the categories of Greek thought. Knowledge of the exegetical and dogmatic works of the Greek Fathers was therefore essential to the West. Augustine found it necessary to study Chrysostom in order to combat Pelagianism in Africa, and two centuries later Pope Gregory the Great, who knew no Greek, acknowledges with gratitude the receipt in Rome, from his colleague at Alexandria, of extracts from authorities such as Basil and Epiphanius, in confutation of a heresy which had not, so far as he could discover, been



Giraudon

Portable objects such as illuminated manuscripts brought exotic motives and influences to bear on the furthest corners of western Europe. (Above) The remarkable, perhaps oriental, imagery of the 11th-century *Apocalypse of Saint-Sever*, with its unusual treatment of the four and twenty elders, seems to be reflected in the tympanum (below) sculptured at Moissac in the early 12th century



Giraudon

mentioned in his Latin sources. Further, the *Acta* of the great Church Councils were in Greek, and someone had to be found to translate them for the benefit of the Western clergy. This was not always easy; bilingual scholars with the necessary qualifications seem on various occasions to have been scarce, even at Rome and Constantinople.

Nevertheless, despite continual schisms and political differences, relations between East and West were never wholly interrupted, and when Gregory the Great dispatched Augustine on his mission to England, connection was re-established between this country and the Mediterranean world. Greek influences were thus mediated to western Europe through the Roman Church; the growth of monasticism, too, spread the teachings of Basil the Great, which had largely contributed to the Benedictine Rule, and monasteries formed centres of learning to which gravitated the wandering scholars of a later age.

Much has been written about the knowledge of Greek possessed by Western writers during the 7th-9th centuries. Recent research has tended to reduce the earlier estimates. A good deal can, in fact, be done with a glossary, some ornamental Greek lettering, and a nodding acquaintance with grammar, eked out by quotations drawn from available Latin sources. Occurrence of Greek words and phrases, therefore, cannot necessarily be taken to imply more than this. Bede at Jarrow is of course an exceptional figure, unequalled in this respect until the arrival of John Scotus the Irishman at the West Frankish Court in the 9th century. Elementary instruction in Greek seems to have formed part of the curriculum at certain monasteries, notably at St Gall in Switzerland. But of a creative use of original Greek thought at this period no real evidence has so far come to light.

The influence of Byzantine art on western Europe is an intricate question. Increased appreciation of the Byzantine achievement has led to a new emphasis, which at times appears excessive, on the specifically Eastern element in certain of the surviving examples—unfortunately all too few—of the artistic production of this period. Something has already been said of the contacts established between Byzantium and the West, and of the almost magical prestige accorded to the great city on the Bosphorus. This prestige was enhanced by admiration for the precious materials, the skilled technique, and the developed artistic conventions and iconography of the Byzantine craftsman. Portable objects—illuminated manuscripts, ivories, reliquaries, enamels, textiles and metalwork

—brought this exciting influence to bear on the furthest corners of western Europe; and workmen from Mediterranean lands are known to have been employed in the decoration of palaces and churches. Charlemagne brought materials from Ravenna for his buildings at Aachen; and Carolingian art, that strange ferment of Celtic, Late Roman and other elements, drew also from Byzantine sources. In the last decades of the 10th century, the marriage of Theophano, a Byzantine princess, to the son of the Emperor Otto the Great brought with it an influx not only of Greek monks and counsellors, but probably also of Greek artists, to German territory. The brilliant efflorescence of German art at this time, though parallel in many aspects to contemporary developments in France and Italy, may be connected with this Greek inspiration. Byzantine technical skill and example served often, perhaps, to enable the craftsman of western Europe to express himself more adequately in his own style.

In this country, Wilfrid at Hexham and Benedict Biscop at Monkwearmouth, frequent visitors to the Continent, imported foreign workmen and foreign works of art during the 7th century. Stone churches were erected, and the remarkable group of Northumbrian crosses dating from the 7th-8th centuries, which exhibit, as Mr Kendrick has well said, "a conscientiously humane and classical sculpture", of a quality never before equalled in England, show that the need to reproduce, for the purposes of dogmatic instruction, the naturalistic figure-art of the Mediterranean has affected the abstract, pattern-making tradition of northern and Celtic art.

Thus, both in art and letters, direct Greek influence on the West during the early mediæval period, though never wholly absent, was intermittent and, as it were, incidental. Single manuscripts, treasured Byzantine objects, exercised far-reaching effects. The Western Church, severely practical in its attitude to Greek learning, used it principally to combat heresy and to explain the Scriptures. Most of such material was drawn from previous Latin translations and commentaries. Natural science, save for its value in expounding, for example, the Book of Genesis, or for allegorical purposes, was comparatively neglected. It was therefore through Moslem channels, as Dr Sherwood Taylor showed in the June number of this Magazine, that Greek science and philosophical speculation were once more transmitted to the West. Contacts both with Byzantium and with the Moslem world grew closer with the Crusades, and henceforward the stream of Greek influence becomes continuous.

Javanese Classical Dances

by R. M. SOERIPNO

The author acted as compère to the Javanese dancers who were recently in London, introducing each performance with descriptive comments to which the following article provides a wider background

THE Javanese classical dances shown as the main part of our programme are extracts from dramas which are a mixture of ballet, opera and play, because the players dance, sing and talk as well. These dramas in their turn are parts of very long epics originating from Indian and Javanese sources. Owing to the Indian penetration of Indonesia described in an article in the January 1946 number of this Magazine, we inherited from the Indians not only the epics, legends and mythology, but also the technique of dancing. However, we only took over certain basic principles from the Indians, and on these we developed our own art in accordance with the particular philosophical outlook that we had in those ancient times. The Indian stories themselves have been revised, and Javanese authors and poets have created new stories, new characters and figures, and altered the names of persons and countries, all within the framework of the old Indian epics, the *Mahabharata* and *Ramayana*.

The *Mahabharata* is the story of the great battle between two families who are related to each other; the Pandavas, among whom is Arjuna, and the Kauravas. The epic ends with the final battle, Bharatayudha, in which both families put all their strength in men and arms, and which ends at last in the victory of the Pandavas. The *Ramayana* tells the story of another great battle, this time between King Rama with his Queen Sita and his brother Lakshmana, together with the Kingdom of the Apes under its King Sugriva and its bravest general Hanuman, against the Giant King Ravana.

Entirely Javanese are the *Pandji* stories, and the epic *Langendryan*, both dealing with Hindu Javanese Kingdoms. The *Pandji* stories tell us about the adventures of a King of Kediri, who is famous for his great loves, and also for his courage and tenacity in his fight against invading armies from across the seas, whether they are Bughis from Celebes or Patani from some vaguely identified country. The epic *Langendryan* contains legends about the Kingdom of Majapahit, which succeeded in uniting nearly all the islands of which Indonesia is composed at the present time.

Those who attended the performances of

the Javanese Dancers saw that we have a quite different approach, as far as technique is concerned, from the Western art of dancing. The dance-dramas are derived from plays with puppets silhouetted against a screen, called *Wayang Poerwa* or *Wayang Koelit*. *Wayang* means shadow, and the fact that the play with human beings is also called *Wayang*, namely *Wayang Wong*, indicates clearly that the play with silhouettes is the original form. This is further shown not only by the mask-like lack of expression in the dancers' faces but also by their poses, since they always try to imitate the carved leather puppets of the shadow-plays and to move in two-dimensional directions.

Though the dancer's face is expressionless, this does not mean that the dance is not lively and vivid. On the contrary, whoever the anonymous creators of the Javanese dances were, they achieved a very great success by putting all expressions of character and emotion, temperament or particular mood (such as anger, joy or sorrow) into the movements of the arms, hands, fingers, head and legs, while the scarf around the middle plays an important rôle. Every character has his own peculiar movements; and of course his specific dress, so that a Javanese audience can recognize him at the first appearance on the stage.

A dance revealing the Javanese art of dancing at its best is the *Kelono*. Here one can see how, merely by using arms, hands, fingers, head, legs and scarf, the King arranges his dress, combs his hair, looks into the mirror, performs his make-up; and how, unable to suppress his feelings, he tries to embrace the vision of his beloved: he moves his arms to indicate a deer in the rutting season, and is then caught by surprise because the vision disappears. At last he grows impatient; but in the end he recovers his self-control and becomes once more the dignified King.

With its many variations, however, the Javanese dance remains classical and is bound by certain basic principles and styles. The basic movements show merely that the character is a human being, acting, moving, resting, looking and fighting as a human being, but in a stylized manner. Thus we



The sembah ("greeting"): a movement of the hands with which every Javanese classical dance begins. Here the dancer's head is turning from left to right in the patjak goeloe, to mark the end of the first part of the movement; after which the hands will make a symbolic and honorific lotus flower



The tandjak: a pose adopted immediately before the dancer starts walking or 'flying'. The variant shown is a tandjak for the Kasar dance of rough characters, with uplifted arms, in contrast to—



—the posture of an Aloes (refined or female) dancer, whose arms are hardly raised. This is King Pandji, a hero of Javanese legend; the character opposite derives from an Indian epic (see plate 8)



Milang miling: "looking into the distance". The character is Queen Sita, wife of King Rama in a dance derived from the Indian epic Ramayana. She is startled by the arrival of the Giant King Ravana, her husband's enemy and rival



Another variant of milang miling: part of a magnificent dance called Kelono, the dance of a king awaiting the arrival of his beloved and making the final arrangements of his dress. The king is wondering whether she is coming



Antra soemping: another part of the Kelono dance. The left hand holds a mirror (the scarf), the right hand is arranging the ring and other jewels on the dancer's ear



Ngridong: a pose only for female dancers. The dancer is moving sideways, while every step is stressed by the patjak goeloe (turning of the head from left to right)



Photographs by Baron

Moments of informality occur in the sequence of Javanese traditional dances and allow individual expression to the dancers. A pose of the Ape in the Ramayana: the army of apes, under its King Soegriva and his best general Hanuman, helped King Rama to win the battle against King Ravana

recognize the *sembah*, the greeting with the hands, followed by the symbolic offering of a lotus flower to honour the onlookers, the *sabetan*, the movements with the arms before the *tandjak*, the pose immediately followed by the walk. We also recognize the *milang miling*, the pose of gazing at a distance, and the moments of challenge before a fight.

The three styles observed in all Javanese dancing are known as *Aloes*, *Gagah* and *Kasar*. The *Aloes* dances are those of women and the noblest heroes, and therefore of people with a gentle and soft character. An *Aloes* dancer hardly lifts the arms or the legs, and always does his or her movements very slowly. *Gagah* dances are performed by heroes of more proud and firm character, but, though they lift their arms and legs higher (the arms up to the shoulders) and do their movements more quickly, they still remain self-controlled and graceful. These *Gagah* dances are also done by evil characters, for instance by many of the *Kauravas*. The other *Kauravas*, however, and all *Raksasas* (giants) dance the *Kasar* dance, with rough and rude, rather uncontrolled movements, lifting the limbs very high and quickly, with the arms higher than the shoulders.

There are some figures in the dramas who do not always follow these classical rules, but have untraditional, characteristic poses and movements, for instance the Apes, and also the Boughis or Patani, who fights with the modern, unclassical style of fighting, the *pentjak*.

The dances are accompanied by Javanese music, played by the *Gamelan* orchestra, which has a quite oriental music scale and rhythm. An orchestra mainly consists of wooden and metal xylophones, different types of small and large gongs and cymbals, a flute, a two-stringed violin and a conducting drum. The leader gives the rhythm for both the music and the dance by tapping on wood and metal.

The group of dancers who came over to England consisted of amateurs. In Indonesia there are only very few companies of professional dancers, and the best dancers never belong to these companies, but are to be found at the courts of the sultans and princes. Performances were given in these courts only at festivals, and not as means to earn the dancers' living. Most of them are relatives of the princes, and dancing is part of their education. The few professional companies travel from place to place to give their performances at primitive theatres, but they do it mostly at certain seasons, for instance on days of religious festival.

The common people cannot of course hire

these professional companies to give a complete programme to celebrate their festivities (such as marriages), though they do hire some dancers with a smaller orchestra to give parts of the dramas; but they prefer performances of the *Wayang Kulit*, which are not so expensive.

Thus the feudal element in the Javanese social structure has been a hindrance to the popular development of the dance. Moreover, the Western system of education has caused leading non-feudal intellectuals and artists to drift away from our own cultural traditions.

It should not be concluded, however, that these hindrances, and the consequently somewhat static nature of the Javanese art of dancing, have rendered the dance-dramas unpopular. On the contrary, there are many things in the dramas which make them beloved by the whole people. The traditional characters are regarded as ideals, up to the present time. Ardjoena or Pandji is the ideal Javanese hero, noble, gentle, but gallant; Gatotkatja is the ever energetic Indonesian; Srikandi, Ardjoena's second wife, is the modern woman, striving for equal rights; and guidance is still found in the philosophy and wise teachings of Krishna, the divine adviser of the Pandavas.

Though feudal in conception, the Javanese dramas are filled with a democratic spirit. There are, for instance, the three servants of the Pandavas, comic figures, representing the common people (who are, by the way, full of jokes and satire about present conditions), called Semar, Gareng and Petroek, allegedly loyal and devoted servants of the Kings, but in reality more powerful than anybody. On one occasion Petroek was sent away by his angry master, but he succeeded in forming a kingdom by himself, and no hero of Pandavas and Kauravas, then united, could defeat him: they had to leave this to his brother Gareng, and his father Semar. On another occasion Semar, not satisfied with one of Siva's decisions, went to heaven and forced all the gods to surrender to his will. The lesson is that the common people, though ugly and poor, can, once aroused, be invincible.

Stories such as these, and the general emphasis of the Indian and Javanese epics on patriotism, noble ideals and the struggle for freedom, make the Javanese dance popular even in its present form. Much will depend on changes in the social system of the future Indonesian State, if success is to attend further efforts to break through the present static and feudal crust and to make the art of dancing a real cultural property of the whole nation.

Airman's Britain II

by MARY DE BUNSEN

The first part of Miss de Bunsen's article appeared in our August number. In it she explained that her purpose, after several years of cross-country flying as a war-time ferry pilot, was to describe Britain, not as seen from a heavy bomber or airliner navigated by wireless and instruments, but as it appears to the man who flies himself about in a light aeroplane by map, compass and common sense

To have learned to trust the compass is to have gone far towards competence as an elementary navigator. But in England its accuracy and one's own rudimentary dead reckoning may be verified by reference to landmarks so numerous that they tend to confuse the visiting pilot from overseas. The most unmistakable are the big lakes and reservoirs, provided that you do not take the occasional unidentifiable reservoir too seriously. The creation of artificial lakes to supply distant industrial cities with water occasionally gets ahead of the output of new editions of the Ordnance Survey flying maps.

The landmarks of industry are helpful where there are not too many of them. Cooling towers, for instance, are a reliable means of identifying a town such as Luton or Darlington. Certain gasometers are good friends to the airman; for example, the one near Southall, which is 319 feet high, will now be a fine landmark for the new London airport at Heathrow. In snow, natural landmarks are softened down and camouflaged, while the pattern of industry emerges more clearly in the black scars of railway marshalling yards and the stark lines of chimneys and warehouses. And where the morning mist has drawn a veil over some town, obscuring the road, river and railway pattern of the map, a tall power station, groups of factory chimneys or a cathedral apparently detached from its surroundings and adrift in a calm, pearly sea, will together add up into a city recognizable even through its temporary disguise.

As you approach your destination, general navigation according to hills, valleys and the lie of the land will give way to detailed map-reading, with due reference to the compass. In good weather you will probably steer a direct course for the aerodrome itself. In bad weather it may pay to set a course for some unmistakable local landmark and there alter course for the last few miles, aiming to arrive in the aerodrome circuit according to the one-way traffic (which is generally anti-clockwise) so as to reduce the risk of collision. Perhaps two clumps of trees on the edge of the downs

will confirm that you are a few miles from the aerodrome, and from there a roughly-guessed compass bearing, or a road, or the orientation of a lake, will provide a pointer which, in bad visibility, will guide you almost down onto the runway.

The pilot sees England bisected longitudinally by the Pennines and from east to west by the midland smoke. It is not, of course, always smoky, and an easterly or westerly drift of wind generally leaves a better passage to one side or the other. But the smoke is present in one's mind as an almost tangible barrier, and in fine, still, frosty weather in winter, north-bound ferry pilots would accumulate at places like Pershore, to the irritation of the resident R.A.F. Once, when very timid and inexperienced, I spent eight days at Stratford-on-Avon, alternately contemplating the visibility (which was measured in yards) and my second Hurricane (I had broken the first). Everything of the remotest interest connected with Shakespeare having been removed from Stratford to a place of safety, it was a bleak and unfruitful week, but I delivered the Hurricane in one piece at the end of it.

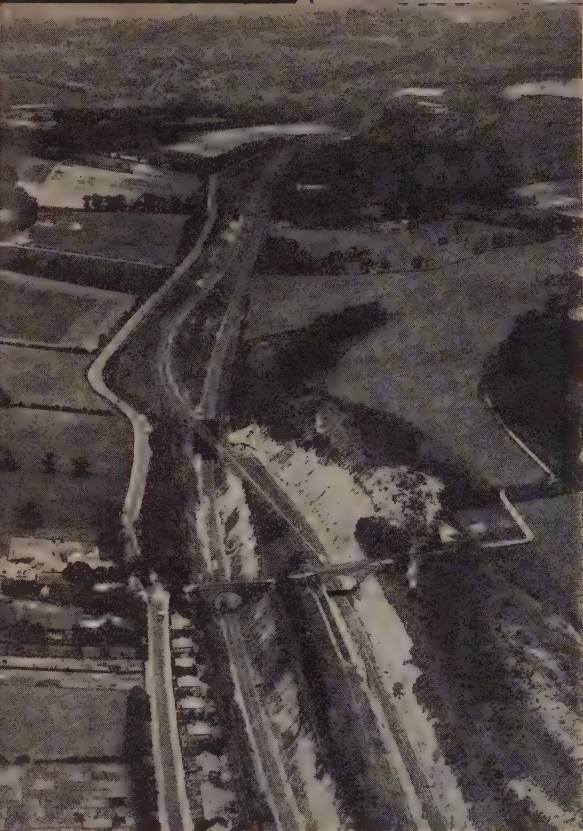
Hills and smoke can be discounted in good flying weather, but in bad weather they effectively divide the country into areas within which local flying may be possible though only pilots equipped with advanced navigational aids can safely pass from one area into the next. The pilot not so equipped will be bold according to his temperament or his local knowledge, and in such cases it is helpful to be really familiar with certain main trunk routes. These mostly coincide with low ground, river valleys, main railway lines in flat country where they run fairly straight, and where they do not, the immortal Roman roads. Roads are normally misleading to the airman and better ignored, but the Roman ones, because of their totalitarian straightness, are in a different category and often a better aid to navigation than the railways. The Foss Way, originally leading from Exeter to Lincoln, becomes conspicuous south of Cirencester, and



Stump removal in the bottom of valley in the Puget sound valley of Elberta, B.C., while abutting the river and out of its waste flows



Norwich is shrouded in morning mist, but smoke rises and people are awar. The power house and the distant cathedral are unmistakable landmarks



Aerofilms

Deep cuttings in the chalk near Caterham Flying Junction catch the airman's eye, and the road, intersecting railways and two bridges form a combined landmark easy to identify on the map

thence you can follow it north-east for 120 miles or so. Flying on a magnetic bearing of 40 degrees will not take you more than four miles from it over all that distance, and even where it more or less peters out on the ground, its course is usually defined by a conspicuous line of hedges. Cruising at 300 miles an hour, I chose to take my first Tempest up the Foss Way, because I like contrasts and perhaps because it was a reassuring link with a world where transport was slow, but sure.

That part of Watling Street which runs from London to Shrewsbury is another main thoroughfare to the airman; and the Roman road which merges with the Great North Road from Boroughbridge to Catterick, and continues over the confusing Durham hills to Bishop Auckland, where it leaves you (course and drift securely checked) to carry on by compass until you see the bolder shapes of the Northumbrian hills. The Great North Road was a comfortable thing to pick up in bad weather, south-bound from Scotland. I remember flying down it in low cloud and

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Aero Pictorial

The Roman roads are still main thoroughfares to the airman. This one, close to the downs north of Hungerford, is straight enough to reset your compass by, and to check your course and drift

heavy rain in a Hurricane, with my flaps a quarter down to give better control at my slowest safe speed of about 120 miles an hour, and nearly colliding with a formation of birds flying up the same road towards Scotland. I am sure they had their flaps down too, but it was evident that they had not mastered the rule of the air, for they were on their wrong side of the road.

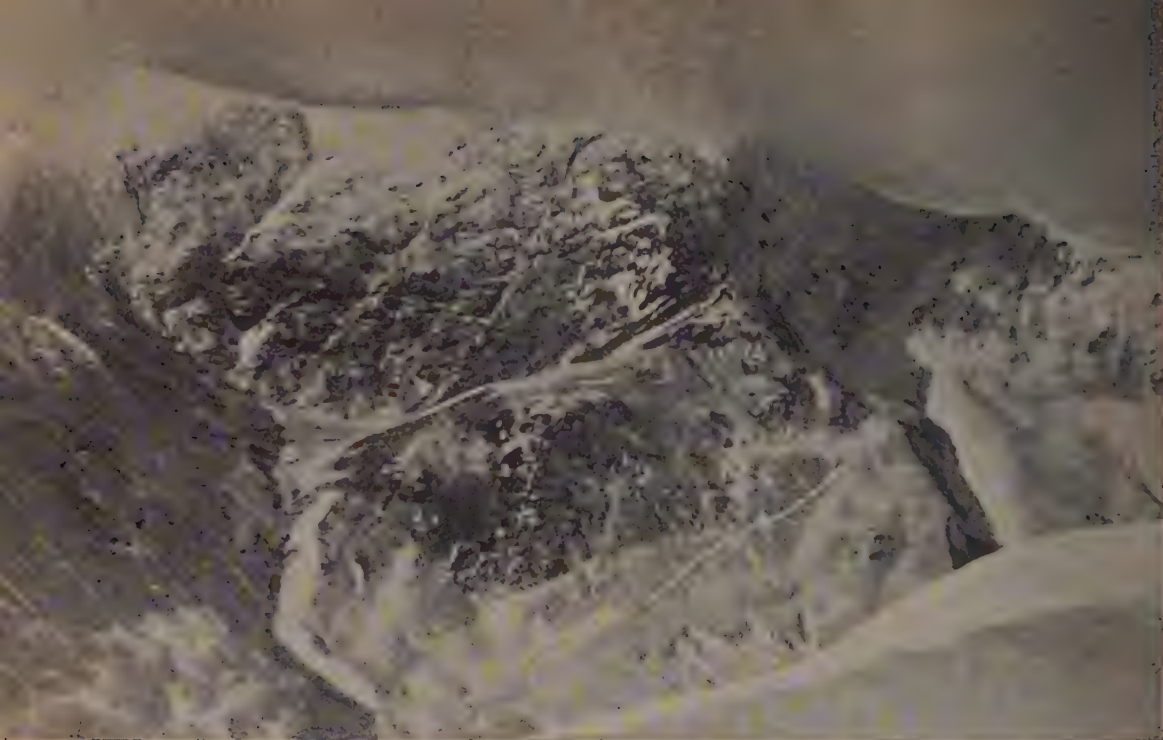
The value of railways to the airman is enshrined in the term 'flying by Bradshaw', which is helpful in proportion to the slowness of the aeroplane and the foulness of the weather. But it is not infallible, because in hilly districts railways wind about and disappear unexpectedly into tunnels, and in industrial country the thick network of them is confusing.

The great rivers are not so much guides as check points, though in a slow aeroplane and bad weather they can be worth following. For example, it may be useful to follow the Severn valley north-west from Worcester for about 40 miles, if you are careful to avoid



Alfred G. Buckha

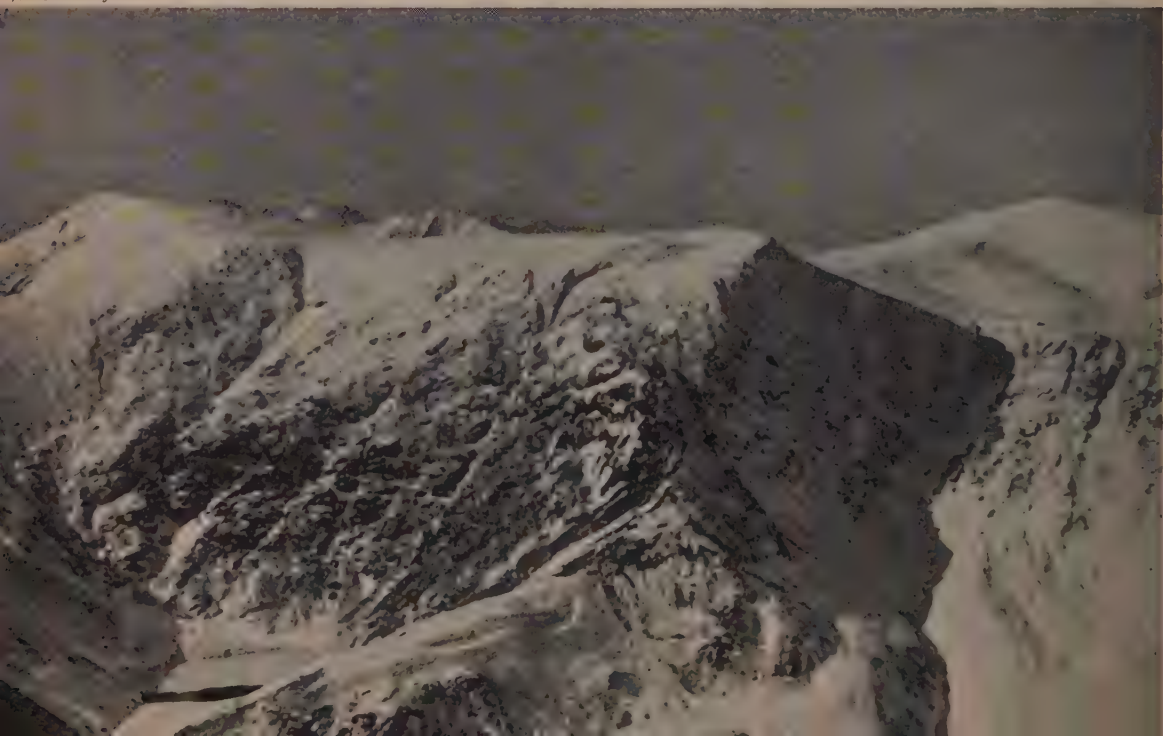
Water is the most conspicuous landmark, especially when the sun is ahead of you, as in this picture of the river Forth, taken from above Stirling. The Forth-Clyde valley, usually smoky, is a geographical and industrial boundary, north of which the population thins out and the real highlands begin

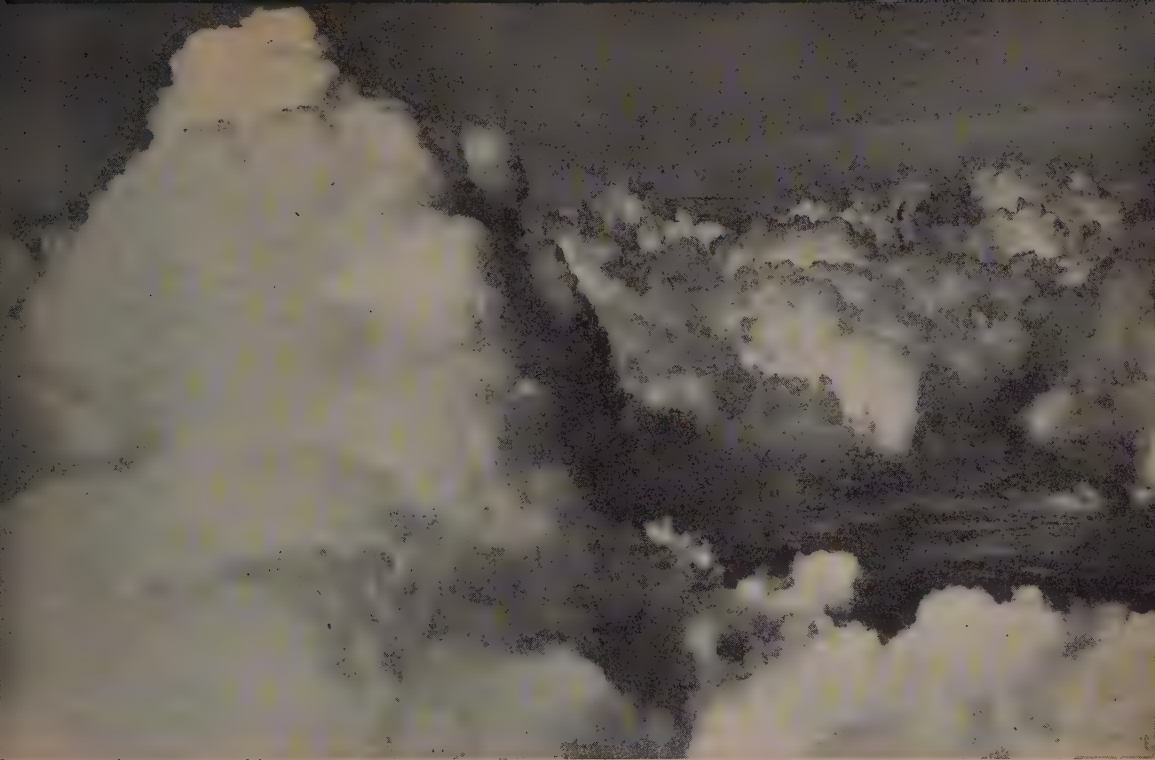


J. D. H. Radford

The Lake District has a black record for airmen, and these two pictures of Saddleback, Scales Tarn and Sharp Edge show how accidents happen. In the upper picture, snow-covered summits blend with cloud, but there seems to be a way out in the top right-hand corner. The lower picture, taken in fine weather, reveals a hidden peak lying in wait for the pilot who tries this avenue of escape

J. D. H. Radford





Aerofilms

Broken cumulus cloud, beloved by the airman. He may explore its peaks and snowfields in splendid isolation, while occasional glimpses of the earth increase his sense of remoteness, yet provide loopholes for descent without instruments, should the cloud begin to close up into a solid mass. Beneath him fragments of cloud at a lower level may lend beauty and perspective to a trim suburb

Aerofilms





Aerofilms

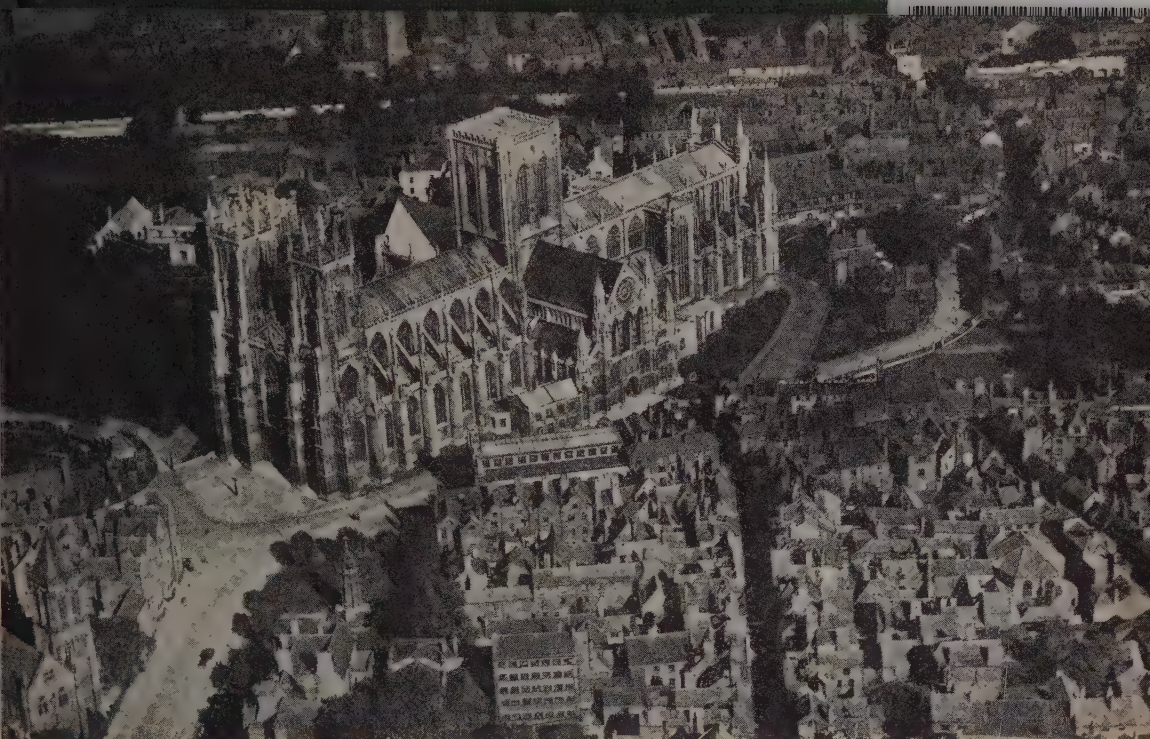
"The lakeland hills will collect clouds unto themselves when the sky is clear all round . . ." Here dirty weather is seen brewing up over Skiddaw, and the deceptive quality of snow in diffused light is clearly shown. Caution advises a détour, but it is tempting to explore further

hitting the Wrekin at the other end of it, and I have often followed the Trent on its meandering course from Newark to the Humber estuary, paying due attention to the power cables near its junction with the Humber.

Taking the west route to Scotland, there is always a sense of liberation when you get past the smoke and out into the clear air of Morecambe Bay, with the alternative of following the coast up to the Solway Firth, going up over Shap to Carlisle, or just going straight over the Lake District if the weather lets you. The lakeland hills will collect clouds unto themselves when the sky is clear all round, and they have a sinister record (though safe enough in good weather), possibly because of the irresistible attraction they have for pilots. I believe that twelve aeroplanes crashed there in one year, and I once found on Great Gable some bits of an Anson that had come to grief on a navigational exercise. Two Hurricanes are said to have flown blind into one of the faces of Scafell with such impact that bits of metal were 'welded' to the rock by the heat generated. But the oddest story of all was told me by an officer engaged on investigating

air accidents in that area. A Wellington, which disappeared in perfectly good weather, was found wrecked on a lakeland mountain-top, with the bodies of the crew laid out tidily beside it in a row—supposedly by some fatalistic shepherd who had not seen fit to report his discovery. To the mountain walker, it is interesting to see clearly from the air (and without flying dangerously low) tracks which one failed to find when getting off the mountain-tops on foot in mist or storm.

For lack of space, I have said very little about Scotland, though I have got to know and love it largely from the air. Reputedly, the finest air route in Scotland is that down the Caledonian Canal, though I have not had occasion to fly it myself. According to the latest publications, the Cairngorms are no longer a prohibited area, but they are simply strewn with wrecked aeroplanes—a fact which counsels caution in exploring them by a method less exhausting than the ordinary one. The smoky valley between the Forth and Clyde is a geographical and industrial boundary, north of which the airman may choose the easy eastern route to Inverness, well provided with aerodromes, or the wilder



Topical Press Agency

At ground level, houses crowd up against York Minster, and some of its dignity is lost in too close proximity. Seen from above, it dominates the city as it should. Only the airman's wholeness of view can appraise a diversity of buildings, functional and sacred, in their due proportion

and wetter west coast, according to the weather, his reserve of petrol and his own temperament.

The weather of Great Britain is a life-study in itself, and possesses all the atmospheric properties of the most elaborate system of stage lighting, as well as every appearance of a slightly warped sense of humour. The striking beauty of snow-covered hills in sunlight is allied, in the airman's mind, with their rather sinister tendency, in a poor light, to blend with cloud or mist in a grey monochrome very misleading to the eye. Over and above all this, there is the cloud country which gives perspective to the airman's view, and a sense of spiritual freedom and detachment which is impossible to convey to people who think of aeroplanes only in terms of machinery. Alone in a Warwick, south-bound on a winter's day, I once found my way barred by a great snowstorm, lying on the top of the Durham hills, extending inland to the watershed of the Pennines and eastwards an unknown distance out to sea. I failed to get underneath it, or round it. That day the barriers of storm were moving south in parallel lines, separated by wide areas of

cloudless sky. So I climbed up fairly confidently, and at 12,000 feet crossed a saddle between two towering masses of cumulus cloud.

O tell of His might, O sing of His grace,
Whose robe is the light, whose canopy space;
His chariots of wrath the deep thunder clouds
form,

And dark is His path on the wings of the storm.

That magnificent hymn was written before the age of human flight, and I remembered it as the big aeroplane rode smoothly over the tumult. Suddenly there was calm ahead, and I looked down upon the whole plain of York, unnaturally clear in detail and bathed in winter sun. I lost height in a gentle spiral through still air to my destination, to spend the evening by a cottage fireside in a quiet village where life goes on much as it did two hundred years ago.

The rewards of the air pilot are those of the explorer and of the musician who can express himself upon a very perfect instrument. Not the least of them is the freedom of that Greater Britain which two generations of airmen died to defend.

Easter in Cyprus

Extracts from a Diary by LAURIE LEE

ON this greatest day of the Cypriot year, Easter Sunday, we left Nicosia and drove 50 miles east towards the sea. The plain was brown with wheat and stubble, and the petals of poppies blew like red butterflies across the road. A rich green bank of orange gardens rose up in the direction of Famagusta, and above them, spinning in the breeze, stood hundreds of rattling windmills.

We lunched in Famagusta off Palestinian chocolate and figs. Crowds filled the streets and bells the throbbing air. Then in the afternoon we drove up the coast to find the ruins of Salamis. Leaving the road we walked down through groves of arbutus and came to a yellow field of spear-grass standing above the sea. The sun enclosed us without pity, binding our limbs in sheets of sweating air; the sharp flies stung us, and the spear-grass jabbed our ankles till they bled.

Among the broad leaves of the arbutus, and scattered in the grass, smothered with anemones, coiled with black snakes and darting with bright-green lizards, lay the broken stones and pillars of the city, Ionian Salamis. Pillars of marble, piled stones, and bits of statuary littered the sea's edge. An old aqueduct made a few arched steps across the fields towards the far-off springs of Kythrea, then stumbled and fell in a parched brown heap of dust, like a spent man lost in a desert.

Achmed, our driver, his face shining with oiled sweat, had something to show us; and it was strange indeed. He led us into a thicket of shrubs, rolled away a stone and uncovered a hole which looked like a well, only there was a ladder going down into it. "Church door," said Achmed, pointing down the hole. And it was so.

We climbed down the ladder, into the well, and the heat left us, and suddenly, deep in the cool dark ground, we found ourselves in a church with painted walls and candles on the altar. It was a complete church, hollowed out of the earth, a place for secret worship, with nothing to show its entrance but a rough stone in a wilderness.

Climbing back from that cool cave of incense-laden darkness was like climbing into the heart of a furnace; the daylight air above us surged with the thunderous sun. We left Salamis and headed north-west for the peninsula. An hour's driving brought us to the town of Rizo-Karpaso, where the joys of

Easter filled all the streets with a flood of tinsel and glittering mirrors.

It was a feast, a rejoicing, the crown of the year; a concentration of birth, spring, harvest, resurrection and blessed holiday. It was a day when the peasants would fill themselves with meat, and the children gorge on sweets and coloured eggs. There was no other feast in the year like this one; indeed for many there was no other day on which they would taste meat, sweets, eggs at all.

The pathways of the town were packed and a-jingle. Musicians sat under screens of palm leaves, sawing at fiddles and strumming lutes. The quick sliding half-tones of Greek dances filled the air; and the café tables were black with chattering men, sipping small sherries and nibbling nuts. And up and down, up and down the street, went the peasant families grouped in all their best. The farmer fathers in white shirts and sweeping *vrakas*, their high boots gleaming, their limbs relaxed and slow. The wives in black dresses starred with pearl buttons, the children in bows and sashes, and the girls, unmarried, in coloured prints, clustering like glowing moths against the white walls of the houses.

A stumbling, endless tolling of bells dragged me to the church—and there I stood transfixed, half blinded with brilliance. For the whole of the building, tower, dome, roof and walls, had been whitewashed new for the feast. And I have never in my life seen a more active, eye-bruising quality of whiteness. In the high bright sun, against a blue-black sky, its domes and arches shouted aloud with light. The world gathered itself up into two piercing opposites—blue and white: where there was shadow it was livid blue, where there was sun it was white; the crucifix on the dome was a white crack in the sky, and the Greek flag flying over the roof lost all its blue in the blue air around it, the white strips of its pattern becoming silver fishes swimming in a profound sea.

What went on in this church today was one thing; but what went on outside it, in the churchyard, was a very different matter. There were girls with long plaits roasting *shashliks* over charcoal fires, old women frying puffs of dough; there were stalls of fruit, pottery and mirrors, combs and ribbons, nuts and cakes. There were loud-tongued men gambling with spinning balls, others challenged us to a turn of a card; boys had nailed targets to

the wall of the church and were shooting at them with popguns and feathered darts. It was a fairground, a circus, boiling with noise; and out of its midst rose the merry church, a pile of white icing in the heart of the feast.

* * *

Easter Monday. There was a tang of roast meat in the air and a sweet heavy smell of flowers like a smell of death. We went to lunch in an oily café, and sat and streamed and ordered wine hysterically. The capital was in the grip of its feast, time was a hiatus, and there was nothing we could do. So we decided to go out to the village of Lithrodonda and look around.

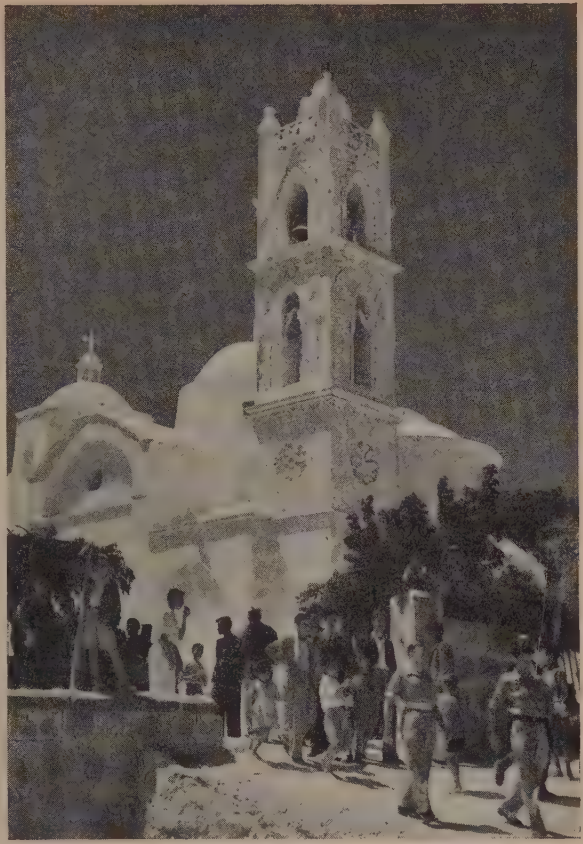
Lithrodonda stands in the hills some thirty miles south-west of Nicosia, and with Achmed we drove out along the now familiar road. Achmed was rollicking at the wheel; he had been drinking all the morning, and he sang now with a lascivious, hoarse invention, baring his rows of monumental teeth, driving through ditches, and feeling fine.

Lithrodonda approached us at last among its stockades of cacti. We found it engrossed in Easter games, powdered with white dust and sweltering in the valley's bowl of heat. Its population seemed to have trebled overnight; people were everywhere, packing the cobbled streets, bunched in the windows, walking the roofs and sitting like birds among the branches of the trees.

We climbed to a wooden balcony and gazed down into the churchyard, which was alive. The entire village paraded before us. In its festive best it walked about, up and down, in and out, lingering and chatting, squatting and drinking, with a slow greed tasting the precious day. There were long crocodiles of women in pale dyed dresses weaving among the trees; the young ones dark, straight and beautiful, swaying on oiled hips, the old ones shuffling slow, hobbled by broken boots. There were girls with embroidered handkerchiefs trailing plaits of glossy hair; some stood in a ring playing a quiet game, others walked arm in arm in a circle, endlessly following each other's tails, whispering together. A young man climbed the balcony and adopted us. He explained the murmuring circle of the girls.

"All the year," he said, "they work and see little of each other. Now they will walk and tell what has happened to themselves."

In the dusty veil that dropped from the



Ralph Keene

white sky people moved like figures on a screen, my head burned and ached, and I saw them afar off. Within the wide ring made by these girls the men were playing noisier games, springing upon one another's backs, shouting with triumph and riding each other hard. The younger boys, with keys, nails and match powder, ran to and fro making loud bangs among the walking legs of the girls.

Around the church, within and without the walls, the usual stalls were set up—barrows of dates and peanuts, sweets and cakes. Old women were squatting and squinting over little stoves, frying pancakes and droplets of dough in smoking vats of oil.

The village was beginning to know us; they called up to us on the balcony, and we went down, launching ourselves into the dark and coloured stream. The soft dust silenced my feet and frying smells assailed me; I was a stranger who had returned thrice to the village, and faces smiled from thickets of black lace, calling a welcome and naming me by name. I squeezed into the churchyard feeling happy,

and Easter greeted me with the mixed voices of bells, calls, shouts and tin trumpets.

Nikos came striding up on his long strong legs, and seized my hand. His eyes were singing with wine, his friendship immediate.

"Lavrendius!" he said merrily. "Ow'ryou! Ow'ryou! Goo-day. Goo-day. Goo-day!"

I pointed to my companions and said their names, and they were embraced. The few words we shared in common we repeated over and over again, like driving in a nail. Nikos collected us within the boom of his long arms and moved us through the crowd.

At the door of the church was a mass of women, their arms and breasts all hung about with babes. Blue smoke of incense rose from the doorway and curled up into the dusty daylight. The young man who followed us said:

"It is a christening. Go in."

The women parted with smiles from the doorway, beckoning to us. We stepped forward into the spicy gloom and saw rows of shadowy women grouped before a font. A girl came with two lighted candles and placed them in our hands. We were pushed to a place near the font and became part of the ceremony, mute godfathers of the hidden whimpering child.

The priest appeared, tall, splendid, in heavy embroidered robes, and his boy walked before him performing elaborate antics with bells and censers. The priest and ourselves were the only men present.

At last, from the group of women stepped a girl, hushed, with a white writhing ball of linen in her arms. She placed it on a table and unwrapped it, then she took out the child, minute and kicking, and laid it naked before the priest. The priest poured water into the font and sprinkled the water with drops of olive oil. Then he dipped in his finger, and took the child, and made the sign of the cross over its forehead and eyes, its mouth and breast, its belly, legs and back.

After the baptism there was a procession through the streets, headed by a boy with a painted lantern. With the mother and child went the long shuffling tail of women, all clutching candles that flamed and drooped in the hot air like withered lilies.

In the churchyard the games went on. As the afternoon grew cooler the men and boys began to show off their strength, and we were drawn into it. I remember it still as a fantasy. Along the wall of the church, in the heavy shade, the girls had gathered their rainbow-coloured bodies, crouching in silence and watching us with rows of white-black eyes. In distant groups the older women were spread in the dust, pouring water from bottles down the throats of choking infants.

A space was cleared, and the men took off their coats. Keene and I took ours off also. Our limbs were white among the leather torsos of the men; the women screamed at the sight of us and rocked on their haunches, the boys patted us on the back and looked us up and down, kindly, but doubtful of our power.

A long-jump was laid out between an avenue of girls, and sprigs of olive marked its start and finish. Young men who were known for this feat went running and flying through the screams of the girls; they came down sprawling on their buttocks, on their faces, kicking up white clouds of dust as they fell. They threw themselves like cartwheels into the air, they broke records, they broke their crowns, they rose bleeding and triumphant from the ground.

Nikos took me and led me to the starting place. His hand made a flight in the air.

"Goo-day, Lavrendius," he said encouragingly.

The village watched me as I crouched for my run. The dark faces of the girls marked out my course. I was the stranger, unpredictable; clown, cripple or eagle, no one knew, but all eyes looked for wings on my ankles and all were ready for any revelation. I drew in my breath, I ran, I flew, I came down with a thud that shook me to the teeth. I found myself lying flat on my back among the girls, wrapped up in a knot of naked legs that squirmed and slithered from me like a nest of startled snakes. There were screams and cheers, and Nikos raised me to my feet, but I was yards behind the winner.

Now Keene, the hurdler, took up his stand. On thin white legs, incredibly long, he ran and sprang and beat the world. He was the winged one, his jump far the longest, and he was cheered by man and child. But he was cheered partly as a freak, a creature possessing an unnatural length of limb, whose achievement in no way shamed the more normal leaps of the village champions. Then he jumped again, and sprained himself, and was carried away to a café in agony and honour.

We ended our exhibition with a lifting of gravestones. I was rather good at this, and drew praise. But the shepherd Vassos, grinding his teeth, put all in the shade by lifting a stone with a boy standing on it.

As the day grew late, the louder games grew less. The girls walked on at their quiet chatter, murmuring along through the dusky twilight. Infants were borne wailing away, to be packed for sleep in their straw-stuffed beds. The fierce sun failed, and sank, and the hills grew ominous. We retired to the cafés, and drank sharp wine, while savage dogs, in the distant valleys, set up their night-watch howls.

The World from Sutton Hoo

by C. W. PHILLIPS, M.A., F.S.A.

Glimpses of England during the Dark Ages, as revealed by the intermittent light emanating from the Mediterranean world, were given in Mr Moss's article in our September number. Mr Phillips unearthed the Sutton Hoo ship-burial. He now shows, in the light of the ship and the objects discovered in it, what the Anglo-Saxons of that period may have known of the world in which they lived

THE present exhibition at the British Museum of the magnificent jewellery recovered from the Sutton Hoo ship-burial in 1939 has re-directed public attention towards the richest archaeological discovery yet made in Britain, and better knowledge of the character of the contents of the find, which has come with the preservation work now being undertaken, makes it possible to consider more carefully its implications for the general life of the Anglo-Saxons and their relations with foreign lands.

This is the first time that a major ship-burial has been found with its contents unrobbed, and such a discovery gives good hope of shedding light on the foreign contacts of the person commemorated since a large

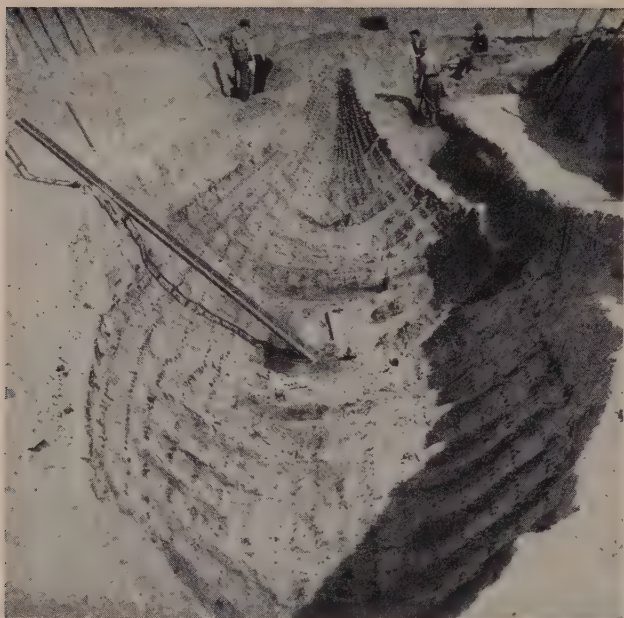
portion of his best earthly goods would be included for his use in the next world, and, among these, imported articles were bound to rank high in estimation. As it was also possible to make a detailed study of the boat, light has also been thrown on the contemporary conditions of sea transport.

The burial was that of a great man who died not earlier than A.D. 650 and whose funeral rites were performed on the banks of the estuary of the river Deben close to the town of Woodbridge in Suffolk. The location of the burial is quite normal, placed near the head of an estuary which is a good boat harbour and gives access to the North Sea, the means of communication between the various peoples of North-Western Europe.



After R. H. Hodgkin: "A History of the Anglo-Saxons"

Stanford, London



C. W. Phillips

A general view of the ship in its grave, looking from stern to bow when completely cleared. The slightly contorted part amidships fore and aft of the ladder marks the site of the burial chamber in which the treasures were found

In considering the significance of foreign objects found in the Sutton Hoo grave it is logical first of all to deal with the boat in which the burial was made, since foreign contacts could only be made by sea. It should be said that although the popular mind is liable to associate the practice of ship-burial in Europe with the Vikings because of the remarkable examples found in Norway and elsewhere belonging to the 9th and 10th centuries, we are dealing with a much earlier example at Sutton Hoo, and also with something which touches English people more nearly. The invaders from North-West Germany and Frisia who put an end to the Roman province of Britain and established the English land and people could only come by sea, and their boats must be a matter of great interest. At Sutton Hoo we have a boat which belongs only to the second or third generation of boat construction since the days of Hengist and Horsa. It is a large open rowing-boat 80 feet long and 14 feet broad, of comparatively shallow draught and driven by thirty-eight rowers. There was no sail, and the method of construction did not permit the erection of a mast. The boat is clinker-built

with nine strakes of oak a side and a heavy keel-plank, but there is no true keel, and the boat must have been wanting in stability without a good deal of ballast. The arrangement of the tholes against which the oars worked made it nearly impossible to back the boat down by rowing, and it must have relied on quick manoeuvre and the hard work of its rowers when in action. Steering was by a great broad-bladed oar over the stern. There was no deck, and a journey in the open sea in rough weather must have been uncomfortable, with much baling necessary to keep the boat from being swamped. Even allowing that the invaders hugged the coasts and only ran across the open sea at the narrowest points, the business of conducting a successful military invasion and then later bringing over women, children and household goods must have been laborious and accompanied by frequent loss. Seafaring was a seasonal matter, for there were no weather reports in the 6th and 7th centuries.

The probability that the Sutton Hoo boat is a slightly improved version of the boat of the invasion period of two hundred years earlier becomes certainty on comparing it with the boat found in a bog at Nydam on the island of Als in Denmark in 1863. This was formerly to be seen in the Kiel Museum and has happily survived the war. The boat, which is in a good state of preservation, was placed in the bog with a great mass of arms as a votive offering for victory, and it is identical in most respects with the Sutton Hoo boat except that its details are more primitive, a matter consistent with its greater age, for it belongs to the end of the 4th century and so was precisely the kind of boat in which the Saxon and Frisian pirates raided the coasts of Britain and Gaul in the century before they summoned up their courage to land in Britain and make a permanent settlement. Against these marauders the Romans built the series of forts round the south-eastern shores of England which begins at Carisbrooke in the Isle of Wight and ends at Brancaster on the east side of the Wash, and to meet them in the open sea a *Classis Britannica* (British Fleet) was also maintained by the Roman province.

Thus, given reasonable conditions of weather and adhering to the cautious principles of ancient navigation, there was nothing to prevent the Sutton Hoo boat from ranging round the shores of the North Sea, entering the Baltic, and also moving down Channel towards the Atlantic, a sufficiently wide scope to account for all the exotic objects found in the burial.

When the relatives and friends of the dead man of Sutton Hoo gathered round to pay him his last honours, the development of the England we know was still in a very early stage. For nearly two hundred years the rising tide of invasion and immigration from the other side of the North Sea had pressed back the Romano-British inhabitants till the only regions in which they were not a subject race were Wales, Devon and Cornwall, and the country west of the Pennines in Cheshire, Lancashire and the Lake District. In the occupied lands the various kingdoms forming the Heptarchy were well established and fighting among themselves for supremacy. Leadership had passed from king to king and now the country was largely dominated by

Penda, the heathen ruler of the Midland kingdom of Mercia with its capital at Tamworth. He had recently been engaged in a series of wars against the East Angles, and in spite of the great defences which they had built on their western frontiers in Cambridgeshire, they had been quite unable to resist the onslaught and three of their kings had fallen in battle in a few years. After the death of Anna, the last of the three, his successor Aethelhere for the moment re-established paganism as the court belief in East Anglia and threw in his lot with the victorious Penda, only to share his fate when he was overthrown and killed by Oswy of Bernicia at the Battle of Winwaed in A.D. 650. Aethelhere's reversion to paganism was one of a number of such incidents in East Anglian history since Redwald hesitatingly accepted Christianity from Ethelbert of Kent half a century before, and it is safe to say that in most parts of Anglo-Saxon England Christianity was still superficial during this period and liable to collapse before pagan pressure.

The Anglo-Saxon lords of the early days of the settlement were all familiar with the



Stanford, London

sea and shipping, and must have shared the practice of ship-burial common among the seaboard peoples of North-West Europe, although so far we have found only three examples of this custom in the England of the period, by far the most notable being the burial under consideration. It is impossible to speak with confidence of the social limits within which the custom held good, but it is certain that kings, their male relatives and great nobles might all expect ship-burial, while this also probably held good for great ladies as well. Those buried in this way might be expected to carry with them for use in the next world a good proportion of what was best in their material possessions, from whatever source they were derived.

A difficult feature to explain of the Sutton Hoo ship-burial was that it was a cenotaph, no body being found in the grave. Under prevailing conditions the loss of the body of the dead man at sea was always a possibility, but the probable date of the burial—round about A.D. 650—suggests the interesting speculation that this interment was made in memory of the dead pagan king Aethelhere who fell at Winwaed, where more perished in the flood-waters of a river than fell by the hand of the Bernicians. In this way his body may never have been recovered, and his commemoration may have been carried out by his brother and successor Aethelwald who, although a Christian, may not have had any scruples about giving Aethelhere the rites he would have desired. However this may be, the burial belongs to the highest social rank, and dates so late in the history of Anglo-Saxon paganism that it can have had few successors.

The richness of the treasure buried at Sut-

ton Hoo is surprising in view of the long train of disasters which had afflicted the East Angles in recent years, but against losses to be expected from this cause may be set the fact that Aethelhere's three predecessors were Christians and so would not be buried with the lavish supply of objects which would accompany a pagan king to his grave. It may thus be that the royal treasury could the better afford the strain represented by the splendid objects devoted to the dead at Sutton Hoo.

This brings us to the objects found in the ship, the majority of which were of native manufacture, but our concern now is only with those imported from abroad. The three areas of origin are Sweden, Merovingian Gaul, and the Mediterranean with special emphasis on its eastern end.

To deal with the Swedish objects first. These consist of a helmet, shield and two swords, all of the finest workmanship. They show close similarity to the work of the Swedish weaponsmiths which have been found in rich boat-burials in the province of Uppland at Vendel and Valsgärde near Uppsala, and there can be little doubt that they were made there and found their way to England. The Anglo-Saxon leaders of A.D. 650 had to be pre-eminent as warriors to survive at all, and it is not surprising that they possessed weapons from the best workshops known to us in Northern Europe in the 6th and 7th centuries. Written history gives us little help in piercing the darkness which broods over Northern Europe at this time. The process of creating the historic kingdoms of Norway, Sweden and Denmark was certainly under way, but conditions of constant warfare prevailed as in England, and two centuries were to pass before



C. W. Phillips

Some of the principal gold objects of the treasure before removal. The purse in the middle has fallen face downwards, and the coins in it may be seen, while various belt fittings lie about

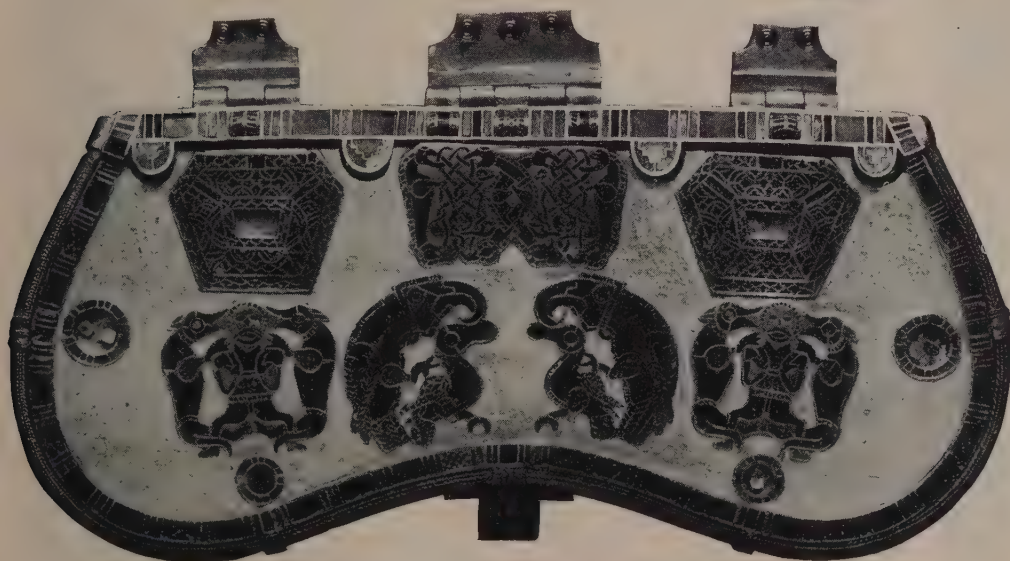


One and a quarter original size

Merovingian gold coins from Sutton Hoo. The Merovingians began, towards the end of the 6th century, by using Byzantine gold coins. Then they copied these themselves. (1. Copied from an early 7th century coin of the Byzantine Emperor Maurice Tiberius.) Next they substituted their own for the Byzantine heads and titles. (2. Coin of Theodebert II, 598-612.) Such coins were made by local moneyers at many mints. (3. Tours and 4. Ussom.) 4. is of late, debased style. 5. is the last, degenerate descendant (end of 7th century) of the gold coinage of Augustus. No more gold coinage was made in Western Europe for 600 years



The great gold buckle and the purse-frame with its jewelled mounts. The buckle is the finest piece of Anglo-Saxon jewellery known, while the purse is a unique object set with various gold plaques decorated with garnet and mosaic glass cloisonné work in dark red, blue and white





the unifying process was to make real progress, and to have, as one of its most serious results for Europe, the beginning of the great series of attacks and settlements in Western Europe associated with the Vikings.

The Sutton Hoo weapons bear traces of skilful repair and were clearly not new at the time of burial. With the shipping resources mentioned above there is no difficulty in accounting for their passage from Sweden to England, though the precise process can never be known. They may be spoils of war, or procured by trade, but are more likely to be the result of the habit of exchanging rich presents which prevailed among the ruling classes of that day. We know nothing of the relations between the Baltic lands and England in the 6th and 7th centuries, but with an ample supply of shipping in the North Sea there must have been a fair amount of intercourse, and in particular through the port of Dorestad in Holland and that of Hedeby near Schleswig. The principle of going into foreign markets for the best weapons has many examples through history, and we may be sure that the Anglo-Saxon warrior chiefs were not backward in applying it.

The objects from Merovingian Gaul consist of thirty-seven gold coins, three gold coin blanks, two small ingots of gold of the kind known to be used in the Merovingian royal treasury, several spears of a peculiar type known as 'angons', and an iron axe with an iron shaft, the *francisca* or throwing-axe of the Franks.

The dynasty of the Merovings had long been established in Gaul by Clovis on the ruins of the Roman province, but at the time of the Sutton Hoo burial his descendants had fallen very low owing to long struggles between the two kingdoms of Neustria and Austrasia into which the Frankish

realm had been divided, and now all real power was passing from them into the hands of powerful nobles. More than a century was to elapse before the land was to come into the strong hands of the ancestors of Charlemagne. But though the affairs of Gaul were confused, the land played a great part in supplying connections between England and the Mediterranean world. The Franks had early become Christians and the conversion of England was greatly helped by the fact that the wife of Ethelbert, King of Kent, at the time of St Augustine's mission in A.D. 597, was a Christian Frankish princess, Bertha. Great fairs were held in Gaul to which Saxon traders resorted, and much must have come through from distant lands in this way.

There can be no doubt that the coins and gold ingots found at Sutton Hoo came from Gaul, but the weapons are not such a clear case. Angons and throwing-axes have been found on a number of sites in the south of England, especially among the Jutes of Kent, so that it is not certain that these are imports, but they may certainly be regarded as evidence of close relations with the Franks. The coins are of special interest because they determine that the date of the Sutton Hoo burial cannot be older than A.D. 650. They are mostly drawn from the north-eastern and Belgian parts of the Merovingian realm, and it is curious that there should be no Anglo-Saxon coins present since the practice of coining money had already begun in England. It almost suggests that the East Angles were looking outwards overseas towards the Franks rather than inland where they were confronted by their Mercian enemies.

The last of the foreign objects are those which come from the Mediterranean. At this time a new situation had arisen at the eastern end of that sea which was to influence the West profoundly. The Byzantine Empire, which still exercised a real or nominal control over some of Italy, the whole of the Balkans, and Asia Minor had just passed through a great crisis which resulted in heavy territorial losses and the establishment of an implacable enemy on its eastern boundaries. The Emperor Heraclius, who died in A.D. 641, had come to the throne when the very existence of the Empire was threatened by the Parthian lords of Mesopotamia. In a series of desperate wars he beat down this foe only to be confronted when in a weakened state by the rise

Rusted remains of the great sword in its wooden scabbard. Parts of the grip and guard have been restored with perspex to carry the gold mounts. Note the jewelled pommel and the two hemispherical gold studs set with garnets in rosette pattern on the scabbard



Central boss of the shield seen in profile. It is of iron enriched with tin, gilt bronze, niello and garnet decorations. Gilt bronze bosses are placed symmetrically round the border. The central stud, ornamented with garnet and niello, has five dragon heads radiating from it towards the bosses.

of Mohammed. This led to the loss of Egypt, Palestine and Syria, and undid at a stroke the advantage gained by the fall of the Parthians. At the time of our burial the outlook for the Byzantines was dark, for they had been compelled by growing weakness to abandon all effective control of Italy to the Lombards, and were cooped up in a few islands and marshes along the coast of the Adriatic. This ended any hope of any further intervention in the affairs of the West.

The chief of the objects from the Mediterranean found at Sutton Hoo is a great circular silver dish of Byzantine manufacture bearing on its base the mint marks of the Emperor Anastasius I who died in A.D. 518. It is the one piece of undoubted Byzantine silver yet found so far west as England. The next is a fluted silver dish with a late classical female head in relief in the bottom and a pair of drop handles. This also probably came from somewhere in the Byzantine Empire, but it is not so clearly datable as the larger piece. A set of nine silver bowls with cruciform decorations stamped in relief was also found in association with two long-handled silver spoons. The bowls are semi-barbarous in type and were probably made somewhere on the eastern fringes of the Byzantine Empire, though it is not possible to place them accurately in the present state of our knowledge. The spoons bear the names SAULOS and PAULOS in Greek characters preceded by a cross and un-

doubtedly refer to the Apostle Paul. Spoons of this type are normally found in the Eastern Mediterranean area and may have been used for sacred purposes, but it is unlikely that they import any Christian character into the Sutton Hoo burial where they are present as valuable objects only, though they may have belonged to one of the earlier Christian kings of the East Angles. It is thought that these spoons bearing the names of apostles may be souvenirs brought back by early pilgrims to the Middle East. There are also two lesser silver objects from the same general background, a parcel-gilt silver ladle and a small silver bowl.

None of the silver objects mentioned above have any real artistic merit, and their interest lies entirely in the distance they have travelled from their place of manufacture to find a resting-place in the Sutton Hoo grave. Their ordinary character suggests that they are not likely to be gifts given by Byzantine emperors to barbarian kings which have found their way far to the west, but are more probably objects of trade, and it is certain that Gaul at this time was full of such things and of fairs at which they were likely to be sold, so that, like the coins, the last lap of their journey to Sutton Hoo may not have been a long one, though some of them may have travelled some 2000 miles westwards since manufacture.

The last exotic objects of which we yet have



Silver spoons of late classical type found with the nine silver bowls. They bear the names Saulos and Paulos respectively in Greek characters and are imports of Christian make from the Middle East

knowledge are six small globular vessels with gilt mounts round their rims. The metal-work is Anglo-Saxon, but the bodies of the pots are made of gourds which must have been imported from Africa or the Middle East.

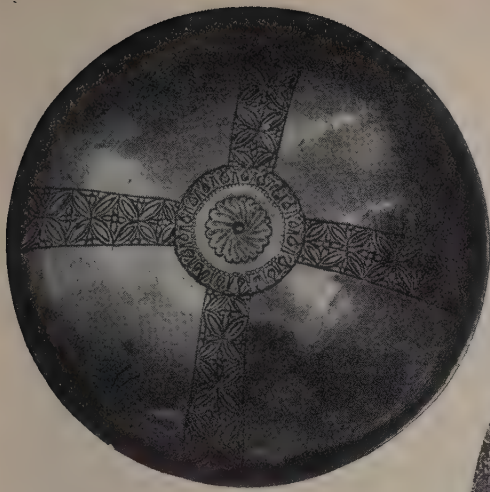
A considerable quantity of much-decayed textile matter from the grave remains to be examined, and it will be surprising if some of it does not prove to have an Oriental origin and even to contain silk.

Thus the Sutton Hoo find not only gives us accurate information about Anglo-Saxon shipping in the mid-7th century, but it also conveys a fairly clear idea of the relationships between the Anglo-Saxon ruling classes and the world in which they lived. While a state of paganism in no way prevented the Anglo-Saxons from contacts with their neighbours in the days before the Conversion, there can be no doubt that the visit of St Augustine in A.D. 597 and its consequences greatly increased the occasions and opportunities of foreign

intercourse. Before they became Christians our forefathers were prone to look backwards towards the lands from which they had come, and however interesting the developments were in Northern Europe before A.D. 600, they were quite insignificant as a stimulus to progress compared with the new contact with what survived of the old classical world, brought about by St Augustine. Two centuries later the Vikings were flocking to Byzantium as the centre of the known world, and at the time of our burial its pre-eminence was in no wise threatened, while the prestige of Rome was reviving fast, helped by the august traditions of the past and fostered in the sphere of religion by the rising power of the Popes. It was a Pope, Gregory the Great, who sent Augustine to England, and it was among Augustine's successors as organizers of Christianity in England, such as Theodore of Tarsus, that men were found who were natives of the Mediterranean world and anxious to foster connections with it. Christianity meant missions to Rome and visits to the Holy Land with all their power to widen horizons, as well as the importation of ideas which were slowly to destroy the clumsy politics of barbarism and to substitute a unified England under the House of Alfred. In all this Merovingian Gaul played the part of a half-way house, and Anglo-Saxons who did not fare as far as Rome encountered on the soil of Gaul, at second-hand, many things that greatly widened their consciousness of the world in which they lived. Thus the old and the new meet in the burial-chamber at Sutton Hoo: the Swedish influences found there were already relics of a barbarous past, and the objects from the Mediterranean, however inferior, were heralds of a more civilized future.

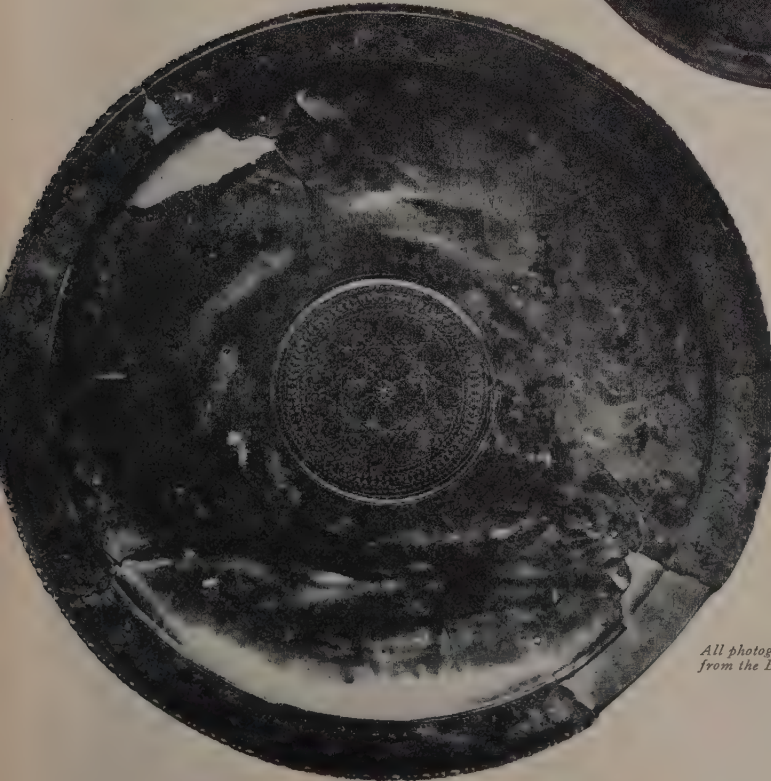


Mint marks of the Emperor Anastasius I stamped twice each on the base of the great silver dish



One of a set of nine silver bowls made on the eastern verges of the Byzantine Empire. They were nested into each other and placed bottom upwards in the grave, All but the two uppermost survived in good condition

A fluted silver dish of debased late classical type, made somewhere in the eastern Mediterranean area and placed in the grave along with a quantity of clothes, shoes, etc. The dish originally had a pair of drop handles, but these became detached in the grave

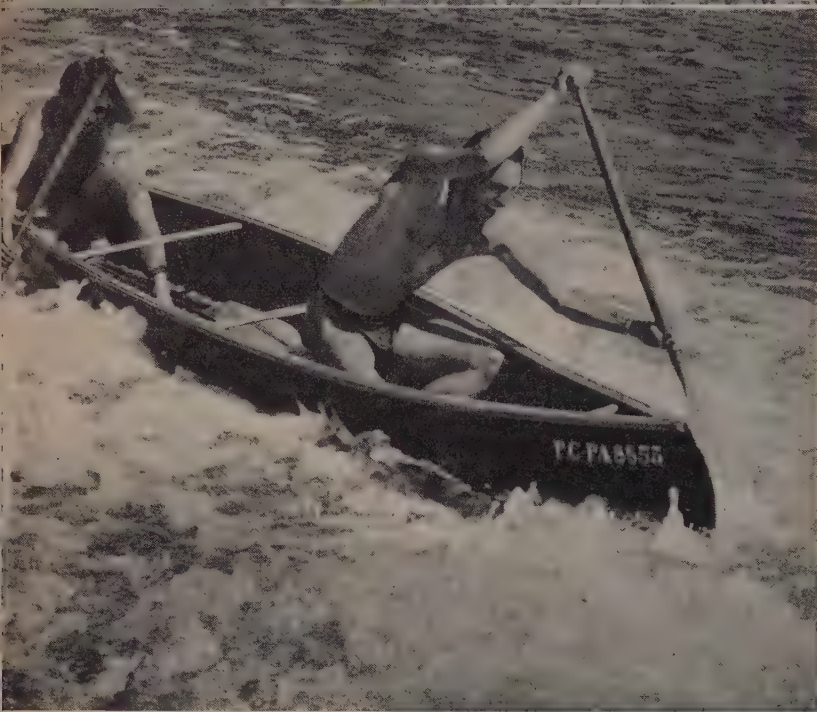


The great silver dish. This piece of Byzantine silver bears the mint marks of Anastasius I, and is notable as being the only piece of undoubted Byzantine silver yet found in England. It is more remarkable for its size than for any beauty of workmanship

All photographs except two from the British Museum

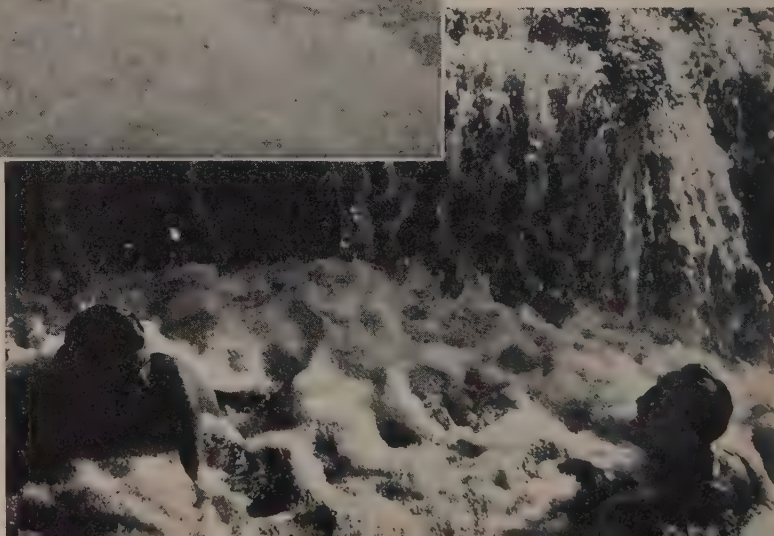
Canoeing in Bohemia

Photographs by MARCO



Holidays in Central Europe! These, as many enterprising Westerners discovered in the period between the two World Wars, are by no means a rich man's privilege. When the Czechoslovak Republic is once again easily accessible to the British tourist, Southern Bohemia will offer him little-known opportunities for an exciting aquatic holiday

The river Luznice rises near the Czech-Austrian border and the canoeist with sufficient navigational skill and athletic zest to shoot, in places, down foaming rapids, can travel along its course for some 300 miles via the Vltava to Prague





As the Luznice approaches Lake Rozenbirk, it meanders for five miles among thick forest. In these stretches the river is in peaceful mood

For its first thirty miles the Luznice runs through a strictly protected game reserve. Bird migrants to lakes and fenland near the wide expanse of Lake Rozenbirk are particularly numerous; and many, arriving fatigued after long flights, are cared for by local peasants until they are fully recovered



The Discovery of the Fourteenth Dalai Lama

by SIR BASIL GOULD, C.M.G., C.I.E.

The author wishes to acknowledge his debt to the Tibetan Government and to many individual Tibetans, including some of those who took part in the search for the Dalai Lama, for the help which they gave him in ascertaining the facts contained in the following account; as well as for facilities afforded to his friend Mr Kanwal Krishna for painting portraits and scenes, and to himself for making a cinema record in Kodachrome of many events connected with the Dalai Lama's Installation

TIBET, the roof of the world, a country of great mountains, plains and lakes, lies at an average height of some three miles above sea-level. To the south of Tibet the Himalayan mountain chain stretches for 2000 miles from Kashmir to Burma; to the east is China; and to the north are the Gobi Desert, Mongolia and Sinkiang. The political status and the political boundaries of Tibet have varied from time to time. There were epochs when the Tibetans were great warriors and the power of Tibet extended far beyond its present borders. But from the 5th century A.D. onwards Buddhist influences flowed in from Kashmir, Eastern India, Nepal and China and, coalescing with primitive forms of religion which were already at home in the country, became the dominant influence in Tibetan life. Gradually there was evolved a definite system of Lamaistic Buddhism and of divine Priest-Kings whose seat of authority is at Lhasa.

Lhasa is situated on the right bank of the Kyi Chu river 30 miles east of its confluence with the Tsangpo (Brahmaputra) river. Its height of nearly 12,000 feet above sea-level is compensated by a dry climate and by the fact that it lies in approximately the same latitude as Delhi, Cairo and New Orleans. Very good crops are produced under irrigation. The city with its 40,000 inhabitants is of a size which is ideal for a corporate life. A few miles away lie the world's largest monasteries, Drepung and Sera, which are reputed to contain 7700 and 5500 monks but often house more. The most important buildings are the Potala which is the official residence of the Dalai Lama and the much older Jokhang, or Great Temple, where the *Kashag*, or Cabinet (*Ka*=order: *shag*=room), meets. A mile away to the south-west is the

Norbhu Lingka (Jewel Garden) which is the country residence of the Dalai Lama.

In Tibet the lay world is strongly aristocratic. But the normal practice is for one son of every family to become a monk, and in a monastery any man may rise to the top. Many women are nuns. The government of the country consists of the Dalai Lama, or during his minority a Regent who is always a monk; a lay Prime Minister; a Cabinet of four, who are known as *Shap-pes* and of whom the senior member is always a monk; and a National Assembly in which the monasteries are strongly represented. Other important officers of State are the Lord Chamberlain, always a monk, who is the chief of the personal staff of the Dalai Lama; lay and monk secretaries; the Chief Oracle who is a monk; and officers in charge of districts or of special departments who may be monk or lay. Most of the Dalai Lamas have been the sons of poor parents but the father of a Dalai Lama becomes a *kung*, or Duke, and is granted properties suitable to his rank. The monasteries are great land-holders.

According to the Buddhist religion, in the animal kingdom death is constantly followed by re-birth—dog or fish being reborn as man, woman, bird, snake or any other animal, and man perhaps as worm or flea. A good life merits re-birth on a higher plane, until at last by goodness man may attain to nirvana. One who, having attained the right to nirvana, consents to be re-born for the benefit of his fellow creatures is called a Bodhisattva.

Various gods, or aspects of the godhead, and remarkable personalities of former time, are held to be present in the world in human form. The persons in whom they are incarnate are known as *Yang-si* (re-born) or *trulku* (change body). Dalai is a Mongolian

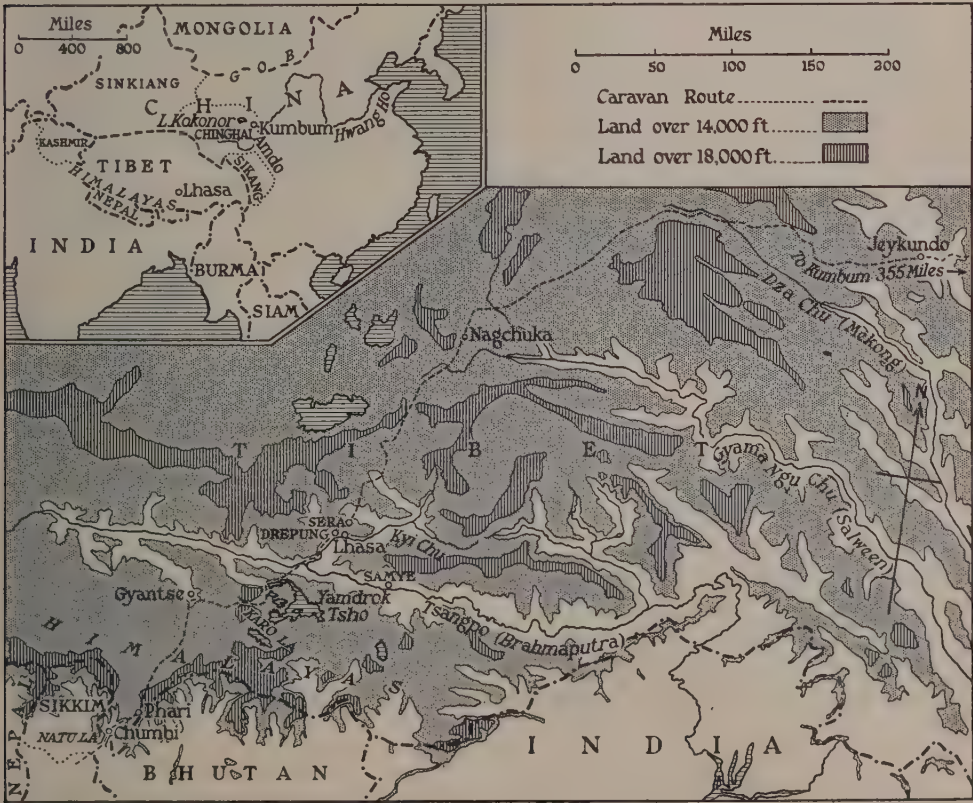
word which means Ocean. Lama means one to whom unlimited gratitude is due and, by inference, a teacher of religion. Only monks of high attainment are properly called Lama. The Dalai Lamas are Bodhisattvas who have consented to be re-born. In them is incarnate Chenrezi, the God of Mercy.

In the account which follows frequent mention is made of white silk scarves. In Tibet it is the custom to present a long thin white silk scarf when one calls ceremoniously on a person or wishes to convey felicitations or condolences, and on many other occasions.

The thirteenth Dalai Lama had been born in 1876, had held the reins of government since 1893, and in 1933, full of wisdom and still full of energy, had "retired to the heavenly fields". On his death the task which confronted Church and State in Tibet was not to select a successor but to seek for and discover a child in whom Chenrezi had become incarnate. It was not necessary that the child should have been born just at the time of the death of his predecessor, or very soon

after it. An interval of time might have elapsed before Chenrezi found and entered his new human abode. It was expected that, as on former occasions, there would be indications of the direction or directions in which search should be made, and that the child would be found to possess physical and mental attributes similar to those of his predecessors.

In the summer of 1935 the Regent visited the holy lake of Chho Khor Gye—ten days' journey east from Lhasa—in which some sixty years before the home of the thirteenth Dalai Lama had been revealed. In its still waters the Regent observed the reflection of the letters *Ah, Kah, Mah*; of a three-storied monastery with a gilded roof and turquoise tiles; of a twisting road which led east of the monastery to a bare hillock of earth shaped like a pagoda; and, opposite the hillock, of a small house with eaves of an unfamiliar type. The exact meaning of the vision was obscure but it was thought probable that *Ah* indicated that the new Dalai



Stanford, London



By courtesy of Dr C. Bellerby

The several Tibetan Oracles, survivals from the pre-Buddhist Bon religion, have been taken over by the Lamaist Church. The officiant's ritual panoply includes this circular breastplate, 9½ inches in diameter, consisting of a plain round steel mirror within a broad frame of golden relief work. In the centre is a mystic monogram, known as "the Long Hüm of the Five Wisdoms"

Lama had been born somewhere in the Chinese frontier district of Amdo, south-east of Lake Kokonor. Further indications that the child should be sought somewhere to the east of Lhasa were afforded by the State Oracle and the Oracles of certain monasteries each of whom, when in a state of trance, had faced towards the east and had thrown a scarf in that direction, and by two portents. It is the custom in Tibet, in the case of the Dalai Lamas and of some others who have led lives of eminent saintliness, not to dispose of the body after death in one of the several ways which are normal in Tibet, but to embalm it, in somewhat primitive fashion. Pending the completion of a fitting shrine, the body of the thirteenth Dalai Lama, so embalmed, swathed in muslins, and the face covered by a lifelike effigy, had been placed on the throne of the lesser audience-hall which looks south over the main courtyard of the Potala. Thousands came to see the dead body, touch the throne, and present a scarf. All night the hall would be securely locked. Twice it had been found in the

morning that the body, which the previous day had been facing south, had turned its head to the east. And to the east of the new shrine, on a pillar of well-seasoned wood set in a great block of stone, and on the east side of the pillar, there appeared a great fungus. Many other signs also indicated that the new Dalai Lama should be sought in the east.

Accordingly in the spring of 1937 parties were sent out eastwards from Lhasa to make search, each under the *trulku* (Incarnation Lama) of a monastery. Another sign was observed when the Oracle of the Samye monastery, in a trance, gave his breast-plate to the *trulku* of the Kyitsang monastery, who had been instructed to set out towards Amdo.

From time to time during the next two and a half years reports became current in Lhasa that boys who might be regarded as likely candidates had been discovered in various places. But the Regent and the Tibetan Government were silent.

Early in the autumn of 1939 it became generally known in Lhasa that a young boy, in regard to whom there could be no possible doubt, had been found near Kumbum and was expected to reach Nagchuka, ten days' march north-east of Lhasa, on about September 20. On September 13 Shappe (Cabinet Minister) Bhondong with a party of Tibetan officials, which had been assembled secretly and in haste, left Lhasa for Nagchuka by forced marches. It was important that the Dalai Lama should enter Lhasa before the end of the eighth month of the Tibetan year, the ninth of the current Earth-Hare year being a black, or unlucky, month.

Fast as Bhondong Shappe travelled, two officers, Kusho Ringang and Lachak Luishar, had pushed on a few marches ahead of him with a mule-litter in which, long before dawn on the morning of September 20, a sleeping child, accompanied by his family, by Kyitsang Trulku and his associates, and by a party of armed Chinese Mohammedan traders on their way to Mecca, was being hurried along towards Nagchuka by the light of lanterns. Bhondong Shappe also had been travelling through the night. A perfect day had just begun to dawn and signs of great good omen were lighting up the sky when the parties met. In token of reverence and homage Bhondong Shappe placed a white silk scarf in the hands of Kyitsang Trulku—for not even a Cabinet Minister may present a



Berkeley Galleries

The Mongol Emperor of China, Kublai Khan, at whose court Marco Polo resided, as a result of a competition in magical feats between representatives of various religions, selected Buddhism as the religion of his Central Asian domains. In A.D. 1270 Kublai raised the pontiff of the Sakya lamas to the temporal and spiritual rule of all Tibet, which some three centuries later was assumed by the present line of Dalai Lamas. This Tibetan banner-painting shows the Sakya pontiff preaching to Kublai Khan and his Empress.

scarf direct to the Dalai Lama—and received one in exchange. It had been thought that the child might be asleep but, unprompted, he put out his hands between the curtains of the litter and laid them on Bhondong Shappe's head.

The sun was rising when, three miles nearer Nagchuka, the parents of the new Dalai Lama, who hitherto had not known that their son was anything more than one of several candidates, saw a crowd of standard-bearers and officials and an elaborate camp laid out in the form of a circle with hollow centre. The Dalai Lama was taken to a throne which had been hurriedly constructed of dry clods of earth. Bhondong Shappe prostrated himself thrice, handed to the child a letter from the Regent acknowledging him as Dalai Lama, and—in Tibet significant deeds are usually preferred to any pronouncement in words—offered gifts which, while they can be presented to other Trulkus besides the Dalai Lama, can only be presented to the highest Trulku present. These were the Offering to All the Gods, in the form of a butter-cake with a number of turrets, which is called *Mende*; an image of Tse-pa-me, the god of endless life; a model of a Chorten (a Buddhist monument); and a miniature holy book. To the parents and other relations he presented dresses and jewellery. The child was then placed in the golden palanquin of the Dalai Lamas and the party set out to cover the remaining ten miles to Nagchuka, where the child, placed on the throne of the Dalai Lamas in the monastery which is called "The Palace of True Peace", held an official reception. After a day's halt the journey was continued towards Lhasa.

On October 6 the young Dalai Lama reached Rigya, two miles east of Lhasa, where he was received with divine honours by the Regent and all important lay and ecclesiastical officials, and was met by representatives of the British Mission and of the Chinese, the Nepalese, and the Ladakhi Mohammedans resident in Lhasa. Two days later he entered Lhasa, where he was universally acclaimed as Dalai Lama, and visited the Great Temple. In the streets of Lhasa he was greeted by the two principal Oracles. Those who have seen a Tibetan Oracle in a trance will understand why people marvelled not at the fact that horses took fright but at the sight of a child who was entirely undisturbed. The Dalai Lama then proceeded to the private residence of the Dalai Lamas at the Norbhu Lingka.

For reasons of State the fact that the Dalai Lama had been discovered had hitherto been

kept secret. But now, the need of secrecy being past, the actual facts of the discovery of the Dalai Lama became known. At Jeykundo the party under Kyitsang Trulku received news of three remarkable boys in the direction of Amdo. The Tibetan Government had provided each of the search parties with a number of articles which had belonged to the thirteenth Dalai Lama and with exact copies. It was anticipated that, as had happened at the discovery of former Dalai Lamas, the genuine reincarnation would pick out the things which had belonged to his predecessor and would show other signs of superhuman intelligence, and that no other child would succeed in these tests. And so it proved. Of the three boys one was found to have died and the second failed to display any interest in the things which had belonged to the late Dalai Lama and ran away crying. But Kyitsang Trulku, on approaching the home of the third, felt a great uplifting of heart. He found himself in surroundings already familiar from the description which the Regent had given of his vision in the lake. He saw a three-storied monastery, with golden roof and turquoise tiles, called after the Saint Ka-ma-pa whose tomb was opposite the monastery (the name fitted in with the letters *Kah, Mah*, which the Regent had seen reflected in the holy lake); and from the monastery a twisting road led on east to a house such as the Regent had described.

Before entering the house Kyitsang Trulku disguised himself as a servant and, sending his companion into the main room of the house, went into an outer room which was used as a kitchen. A child was playing there. When Kyitsang Trulku entered the child at once went up to him, said "Lama, Lama", and seized Kyitsang's necklace, which had belonged to the late Dalai Lama. A few days later, in the presence of other members of his party which included the District Magistrate of Nagchuka and the lay official Kheme Se (he had said nothing to them of his discovery), Kyitsang tested the child with various possessions of the late Dalai Lama, and exact copies. Out of four necklaces the child took two which had belonged to the late Dalai Lama and placed them round his neck, and similarly out of two small drums he chose the right one, which he began to play. In the imitations he took no interest. There remained the choice between two walking-sticks. The child first took the wrong one, examined it, shook his head, and dropped it. He then took the right one and would not let it go. It was found also that the child, in



All paintings by Kanwal Krishna

THE DALAI LAMA



(Above) The head of the Reting monastery who was Regent of Tibet at the time of the search for the Dalai Lama and of his installation. He has since, at his own request, been relieved of the office of Regent. (Below) Kyitsang Trulku (the Incarnation Lama of Kyitsang monastery) who discovered the fourteenth Dalai Lama. At the top left of the picture are his signature in Tibetan and his seal





(Above) The Old Rugbeian, Kusho Changngopa (Ringang), in his official robes as Master of Ceremonies for the New Year 1940; and the commander of the body-guard of the Dalai Lama. (Below) The Father and the Mother of the Dalai Lama. Hailing from the Amdo district, they wear clothes of a more Mongolian type than is usual in Lhasa. They have signed their portraits in Chinese characters



The Potala at Lhasa. On the summit can be seen the golden roofs of shrines which contain the bodies of former Dalai Lamas. The main entrance is on the far side of the building. The city and the Kyi Chu river lie to the right of the picture; to the left lie the Norbhu Lingka and the British Mission. (Opposite) The courtyard outside the Jokhang, or Cathedral, of Lhasa. The Jokhang contains a statue of a goddess of whom the Tibetans believed Queen Victoria to be an incarnation

common with his predecessor, possessed three of the physical signs which distinguish the incarnations of Chenrezi. When Kyitsang Trulku prepared to leave, the child took him by the hand and wanted to go with him, and wept at being left behind. It was related that at the time of his birth there had been a rainbow over the house.

The Dalai Lama was born on June 6, 1935, his original name being Lhamo Dhondup. His father Chökyong Tsering, and his mother Sonamtsö, who were of yeoman class, were both about thirty-five years of age at the time of his birth. Their home Kumbum is celebrated in Tibetan history as the place where Tsongkapa, the great reformer of Tibetan Buddhism, was born. They have three children older than the Dalai Lama and one who is younger.

On November 23, 1939, the Dalai Lama proceeded in state from the Norbhu Lingka to the Great Temple which lies below the

Potala. There on November 24 he and his next elder brother were initiated as monks and he assumed new names which mean "The Holy One, the Tender Glory, Mighty in Speech, of Excellent Intellect, of Absolute Wisdom, Holding the Doctrine, The Ocean".

The Dalai Lama returned from the Great Temple to the Norbhu Lingka where, in his capacity as Dalai Lama, he frequently granted audience and conferred blessing. All who saw him were convinced that he was the one and only true fourteenth Dalai Lama. Those in close attendance on him noted his preference for associates of the late Dalai Lama, his special kindness to the Dalai Lama's servants, and his love of music and of animals and flowers.

The great season of religious observances in Lhasa is the New Year which begins with the February New Moon. At the Potala the evil influences of the Old Year are driven out, and the New Year is ushered in, with tradi-

tional ceremonies, and in every home the New Year is observed privately in a manner and in a spirit which recall our Christmas and New Year. On one day, the chief officials pay a formal visit to the Chief Oracle in his monastery near Drepung. On other days old customs are kept up in the form of a race for riderless horses, a parade of feudal cavalry, mounted sports, and many religious and semi-religious spectacles. On the night of the full moon tall effigies made of coloured butter are set up in the streets which surround the Great Temple and dense merry crowds surge past. It so happened that in this, the Iron-Dragon year, two of the officials most importantly concerned with the celebration of the New Year, one as a Master of Ceremonies and the other as City Magistrate, were two Old Rugbeians, Kusho Changngopa who was known at Rugby as Ringang, and Kusho Kyipup.

This season of the year, when pilgrims flock to Lhasa and agricultural work is at a standstill, was wisely chosen by the Tibetan Government for the ceremony of the formal entry of the Dalai Lama into the Potala and the occupation by him of the Golden Throne of the Dalai Lamas. For six years this throne

had been vacant: but always food had been placed by it, as if the Dalai Lama were merely absent on a journey and might return at any time, and always those who attended ceremonies had bowed to the throne, and offered a silk scarf at it, as if the Dalai Lama had been present.

The ceremony now to be performed would be not the conferring by man of High Priesthood and Kingship on the Dalai Lama, but the celebration of the return of the Dalai Lama, in his own right, to a throne which was already his own.

To attend this ceremony special delegations travelled, from China via India on behalf of the Chinese Government, and from India on behalf of His Majesty's Government and the Government of India. A mid-winter journey from Sikkim via the Natu La pass, the Chumbi valley, Phari, Gyantse, the Karo La pass, the Yamdrok Tsho lake, and across the Tsangpo river—twenty-two stages over four passes ranging from 14,000 to nearly 17,000 feet—is apt to be a serious undertaking. But the weather was kind to the delegates and to the pilgrims who were flocking to Lhasa from every direction.

On February 13 the Dalai Lama granted





The Chief Oracle, head of the Nechung monastery which is situated near Drepung monastery on the outskirts of Lhasa. Indications of the easterly direction in which the new Dalai Lama should be sought were afforded by him and by the Oracles of other monasteries, when in a state of trance



In the main audience hall of the Potala, before dawn on the morning of February 22, 1940. The Dalai Lama is being lifted onto his throne by attendant Abbots. To the left a monk is burning incense. Throughout ceremonies repeated on several days, the Dalai Lama never let his attention waver

audience to the British delegation. On entering the room of audience it was seen that the Dalai Lama, a solemn, solid but very wide-awake boy, red-cheeked and closely shorn, wrapped warm in the maroon-red robes of a monk and in outer coverings, was seated high on a simple throne, cross-legged in the attitude of Buddha. Below and round him on the graded steps of the throne, looking like giants beside the child, were five abbots who included the Lord Chamberlain and Kyitsang Trulku. One felt that the child was surrounded by loyalty and love.

The occasion was one of the audiences which the Dalai Lama grants almost every day and which any Tibetan may attend freely—high monks and low; men, women and children; villagers and shepherds, each bringing, if he was a layman, some offering of at least a shred of white scarf and a few coins, and each sure to receive a blessing. After a time the close shuffling column of those approaching the throne was held back and way was made for the British delegation to approach the throne. The leader of the

party approached the throne, a scarf which had been blessed by the Dalai Lama was placed round his neck, and two small firm hands were laid steadily on his head. The other members of the party followed in turn. Twice tea, and once rice, was served. Meanwhile the British delegation had produced some few gifts—a gold clock with a nightingale that popped out and sang, a pedal motor car and a tricycle. When the audience was over the Dalai Lama was lifted down from his throne by the Lord Chamberlain and left the hall of audience, holding the hand of an abbot on either side but looking back at the gifts which had gripped his attention. Within a minute his next elder brother was on the scene to find out how everything worked, and all the more keen because, as he said, if he did not at once find out all about everything the Dalai Lama would certainly beat him. The boy was soon going round the smooth floor of the audience chamber in the pedal car.

Eight days later, on February 21, a mile-long riot of colour assembled to escort the



Festivities in Lhasa on the night of the first full moon of the New Year. Effigies of coloured butter are set up in the streets near the Cathedral, bands play and merry crowds surge past

Dalai Lama from the Norbhu Lingka to the Potala. First came the Dalai Lama's food, kitchen ware, garments and bed clothes; then attendants carrying tall banners to ward off evil spirits; high Lamas followed by the Chief Oracle and the Chief Secretaries; led ponies of the Dalai Lama in silk trappings; officials of every rank; a palanquin behind whose gold curtains the child sat invisible, borne by men in red and yellow hats and drawn by men in loose green uniforms with red hats and white plumes, and over the palanquin, a little to the rear, a tall umbrella of peacock feathers; next the Regent; the father and mother and brothers of the Dalai Lama; abbots; trulkus from monasteries throughout Tibet; and hosts of others.

On the following days the Dalai Lama granted audience at the Potala. On this more formal occasion the British delegation presented its more official gifts. These included bags of silver, rifles, rolls of broadcloth of many colours, a watch and chain, a pair of field glasses (through which the Dalai Lama likes to watch his subjects in the city below as they go about their tasks), a musical box. Entered also in the list which had to

be handed in were two pairs of budgerigars. Throughout the long ceremony the Dalai Lama's attention never wavered.

What has struck me most about the Dalai Lama both at the time of his Installation and when I again visited Lhasa four years later is the affection which he radiates and inspires. In his presence no one can fail to be happy. And everybody wants to serve him. If there is a children's party at the British Mission, his brothers and sister-in-law save up crackers and balloons and toys to take home to him. He has a smile which is a joy. Like his predecessor, he loves animals and flowers. It has been mentioned that the list of gifts presented at the Potala included two pairs of budgerigars. It was thought that after their long cold journey it might be well to keep them warm at the British Mission and to send them to the Dalai Lama later on. But messenger after messenger came in quick succession to demand them, so they were sent. A few days later, realizing that they might be better off in a warmer place, the Dalai Lama returned them. Not all children are so thoughtful. Not all are so greatly loving and so greatly loved.

Men and Snakes

The South African Medical Corps

by JOHN McGRATH

THIS is a story about deadly snakes, and one of the most remarkable military units that served among the Allied forces during the war. From an old gaol in an isolated part of the Transvaal, known as Komatipoort, came a great deal of the anti-snake bite serum used to save the lives of Allied troops who were bitten by snakes in East Africa, Burma and other tropical battle areas. At this old gaol, which was converted into a snake park, there was established a snake-catching detachment of three men. It was their job to catch some of South Africa's most deadly snakes, keep them alive in the snake park and 'milk' them for venom every week.

Puff-adders, the deadly rinkhals, cobras and fatal mambas were all captured and made to give up their poison at regular intervals in order that an adequate supply of serum should always be available to the armed forces all over the world. The three soldiers who did this dangerous work were no ordinary volunteers, but men who knew the veld and had studied the habits of different varieties of snakes; men who could take a chance and get away with it.

The original member of this strange unit is a Mr M. J. Clemence, who was the chief catcher and who was interested in snakes long before the war. When he was invalided out of an infantry regiment he suggested the Snake-Catching Unit and the South African Medical Corps authorities agreed to its formation.

Mr Clemence has twice been bitten by snakes, but makes light of the fact. On one occasion, he was handling an extremely lively puff-adder when the reptile suddenly bit him

in the fleshy part of the extremity of a finger. Without hesitating he sliced off the flesh from his finger with a large razor-sharp knife he always carries. No after-effects were experienced. The second time Mr Clemence was bitten he was immediately injected with serum. This saved his life, but after the bite had healed he found that the finger that had been bitten was completely stiff and interfered badly with the easy handling of snakes. To overcome this disability he had the major portion of his finger amputated so that he could continue with his war work.

The catching of snakes is no easy task, and different species call for varying tactics if the capture is to be successfully effected without fatal results. Armed with a forked stick and a grain-bag, the catcher sets out over the wild bushy veld on a hot sweltering day, with the



The snake park at Komatipoort. Venom obtained here is used for various purposes; dried puff-adder venom furnishes a blood coagulant for sufferers from haemophilia; anti-snake bite serum is prepared from the blood of horses injected with a mixture of venoms



'Milking' a puff-adder. The fangs are pressed against the edge of a glass, the top of the head is massaged, and the venom trickles out in drops

A squirming mass of puff-adders, which will be made to give up their venom and provide a weapon against their own deadly attack. When dried in crystals, the venom from 45 snakes would fill an ordinary cigarette



temperature above the 100 mark. If it has been raining the snakes will probably be basking in the sun, otherwise they will be in crevices in the rocks or under large stones. Different varieties are also found in bushes and trees. They are nearly always difficult to see until one is upon them.

Once the snake is found the catcher must contrive to pin its head to the rock, ground or tree with the forked stick. The head must be pinned in such a way as to ensure that the reptile cannot free itself before the hunter can get a firm grip, between finger and thumb, just behind the snake's head. When gripped in this manner, the reptile cannot possibly bite. Its body writhes and lashes the ground until it is put into the grain-bag, together with any other specimens that may have been captured. The hooded rinkhals is a difficult snake to catch as it rears up several feet, flattens its hood and makes lightning lunges, hissing all the while. Other South African snakes are extremely fast and attack on sight. One variety has been known to attain a speed of more than 40 miles an hour when chasing a motor car.

To return, however, to the snake unit. The hundreds of snakes are kept on a grassy patch surrounded by a water-filled moat about 18 inches across. Around the outside of this moat is a smooth wall several feet high, which the captives cannot climb. The snakes are fed on a variety of insects and reptiles, including birds' eggs, frogs and mice. Every week they are 'milked' for their venom. This is done by again holding the snake firmly behind the head and forcing the reptile to puncture with its fangs a rubber sheet that has previously been stretched over the top of a tumbler. The drops of poison then trickle into the glass, after which the snake is thrown back into its park, and the process repeated on its fellow-prisoners.

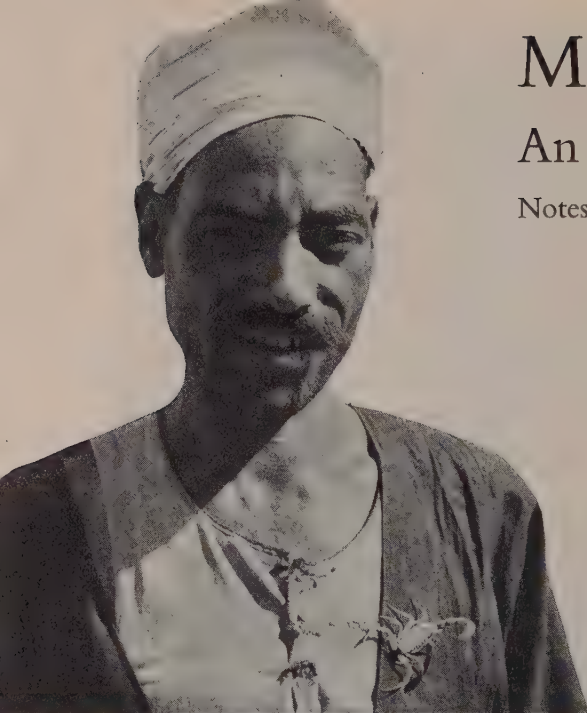
The venom of different species is kept separately and carefully labelled. When dry

it is sent to the South African Institute of Medical Research. Selected horses are injected with a mixture of different venoms. Usually it takes the form of venom from the rinkhals and cobra snakes, which is a nerve poison, and venom from puff-adders, which is a blood poison. Gradually the injections given to the horses are increased. After seven months these horses are taking doses which would easily kill 200 people. After this stage the horses are bled and the blood is centrifuged, or spun around, in a container. By this operation vital serum is separated from the blood, and carefully bottled. It is this serum which finds its way into the medical officer's hypodermic syringe when someone has been bitten by a poisonous snake.



All photographs by the Author

Mr M. J. Clemence, the originator of the South African Medical Corps' detachment of snake-catchers, with Judy, a fox-terrier bitch who is a valuable member of this strange unit

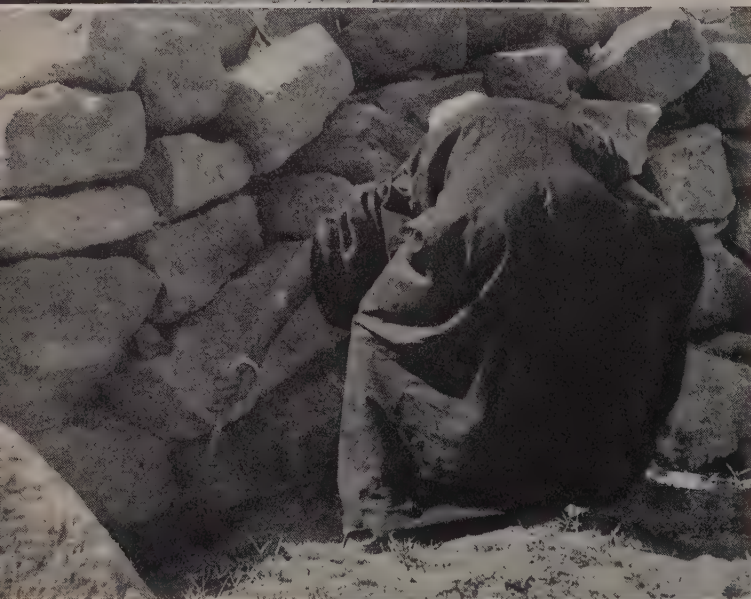


Men and Snakes

An Egyptian Snake Charmer

Notes and Photographs by K. P. BOULTON

Ibn Moussa was introduced to me in Luxor, Upper Egypt, as the local representative of the Rifa'i brotherhood, a Moslem sect claiming powers over 'the poisonous ones'. I was told that he could find, and charm, snakes and scorpions in any place of my own choosing. I therefore led the way to a remote corner of the Ancient Egyptian temple, and Ibn Moussa proceeded to chant, occasionally stopping and facing in various directions as if 'scenting' snakes. In 25 minutes he unearthed from various nooks and crannies in the venerable stones one cobra, two smaller snakes of, to me, unknown species, and two scorpions



Each snake was secured by the tail and further chanting followed, accompanied by vigorous hissing from the snake. Attempts of the latter to strike produced violent curses amid the chanting





The Snake-Charmer's Incantation

No conqueror can conquer Allah, and over Allah
nobody can prevail.

Oh! my helper in the time of need, when help is
lacking.

In the name of the Holy Place and the Holy Book.
In the name of Him, Whose splendour has thrown
open all doors, come out and submit to the
covenant.

I call on you, by permission of my Shaikh and the
master of my cult, Ahmad el-Rifa'i.

In the name of my master Solomon, who holds
dominion over reptiles.

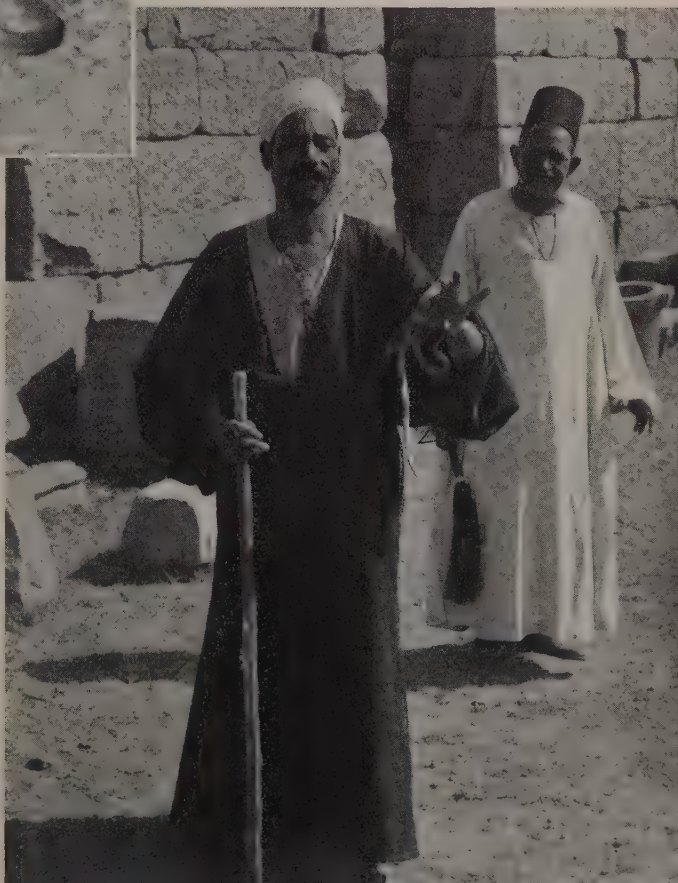
In the name of the Four Wise.

(The reptile is found)

Peace be on you. I will not harm you.

(The reptile is caught)

Seemingly affected by the monotonous sing-song, the snake became almost comatose and was thrown into a basket with its fellows which finally all appeared quite tame. I make no attempt at explanations. This feat is well known to pre-war tourists, but I was in Luxor in a wartime summer when there were very few visitors, and I am still mystified at the way these snakes and scorpions were 'scented out' in a small area indicated by myself. There was certainly nothing up Ibn. Moussa's sleeve, which he kept well hitched up during the process



The Seashore Life of the British Isles

by DOUGLAS P. WILSON

In our December 1945 number the President of the Royal Geographical Society stated that "there is no geographical study better worth undertaking than that of the relationship between groups of animals and plants and their environment". Mr Wilson of the Marine-Biological Laboratory at Plymouth describes herein some of the problems still awaiting solution in an environment familiar to us all. Numerous examples of his skill as a photographer will be found in his forthcoming book They Live in the Sea (Collins) as well as in a future volume of the New Naturalist series

ALMOST everyone has seen a stranded jellyfish, perhaps kicked it as it lay helpless on the beach. All around were probably multitudes of shore animals, quiescent, awaiting the return of the tide, but fully capable of enduring exposure to the air, not prostrate and dying like the jellyfish. Few marine animals can be so completely unsuited to life between tide-marks as it, and a consideration of the respects in which it is unadapted to shore life will give us a clear understanding of the special physical conditions of that environment which are met and surmounted by all those species that grow and flourish there.

The first thing we notice as the jellyfish is left behind by the retreating waves is the way in which its body collapses and sprawls on the ground once the supporting medium, water,

has left it. An animal perfectly adapted to slow swimming, almost floating, at the surface of the sea in summertime, it is incapable of raising itself and moving away once it is stranded. More important than this—many shore animals never move away from fixed positions—its delicate skin does not protect its tissues from evaporation in sun and wind, or from damage by rain in wet weather. All true shore animals are in one way or another able to survive under either condition. If the sea was rough when the stranding took place, the jellyfish was undoubtedly battered and torn as the breakers tossed it ashore. Shore animals must be fully capable of withstanding buffeting by the waves without sustaining damage, or must find some place of refuge from the fury of the sea.



A stranded jellyfish, an organism unadapted to the rigours of seashore life

(Opposite) *Typical shore animals fully adapted to the strenuous conditions of their environment. In the picture are mussels, limpets, acorn-barnacles, beadlet sea-anemones (two of these are near the top right-hand side) and a dog-winkle (near the lower centre of the picture)*



All photographs by the Author

Now take a look at a rock on which there are acorn-barnacles, mussels, limpets and dog-winkles, all true shore animals fully adapted to their environment. The barnacles are firmly cemented down and unable to move away, or for that matter to be washed away. The mussels are almost as permanently fixed by the threads of their anchoring byssus; they can move a little, but not much, and are almost as secure in swirling waters as are the barnacles. The limpet is famed for its power of retaining its foothold; few angry seas can dislodge it, yet it can crawl about to browse on delicate algal growths around the particular spot on the rock which is its permanent home and to which it always returns at low tide. Dog-winkles move about even more freely, feeding on the barnacles and mussels; they too can cling tightly, though in the roughest weather they seek the shelter of cracks in the rocks. All four animals have shelly coverings which protect their soft tissues from drying and shelter them from rain. The tightly fitting shells of the mussels hold water between them, so the delicate gills and other structures are not collapsed by the draining away of the sea outside.

On the rocks with the barnacles, limpets and these other animals one often sees a number of soft rounded bodies, dark red in colour, and obviously able to survive the sunshine in spite of the absence of a shell. They are Beadlet sea-anemones (*Actinia equina*), relatives actually of the jellyfish, but tougher of tissue and containing sufficient water within

to serve their needs until the tide returns. As we see them they are closed up, their tentacles retracted and folded inwards out of sight. They are firmly cemented to the rock and in no danger of being washed away.

There are relatively few shore animals able, like the ones just noted, to colonize the driest situations on rocks fully exposed to the sun; the majority keep to wetter places such as the under sides of overhanging rocks where the sun does not strike, or in the dampness under seaweeds, or only in pools. Even so, they are likely to be subjected to considerable and rapid variations in temperature such as would kill many marine animals from the deeper water beyond. Pools heat up rapidly in summer when the tide falls, or cool in winter, and rocks may go through an even greater rise and fall in temperature; there is a record of a barnacle reaching over 36° C. and this was probably not as high as is sometimes attained. Then there is the sudden shock as the cooler or warmer sea pours over them once more. This ability to withstand changes of temperature is an aspect of shore life that has as yet hardly been investigated.

The varying situations on the shore are inhabited by an almost equally varied assortment of animals and plants. There is, for instance, a special crevice fauna which reaches its greatest development on shale and similar rocks that split readily into deep but narrow cracks. Here are to be found many small worms, molluscs, crustaceans and even mites and insects, some of which are not to be seen



Oar-weeds (*Laminaria digitata*) are exposed only at low-water spring tides of new and full moon

elsewhere. The mites and insects are terrestrial types which are adapted to escape drowning whilst the tide is in. The biology of the crevice fauna has still largely to be worked out.

The higher up the shore an animal or plant lives the longer it is exposed to the air. Round about high-tide mark it is wetted by the sea only for two short periods in each twenty-four hours, whilst at the lower levels it is covered for most of the time. Actually there are very few species which range all the way from high-water mark to low-water mark; the majority have a much more restricted vertical range and are often, indeed, markedly zoned. This feature is easily observed on any seaweed-covered shore. At the top of the tidal range there will almost always be a narrow belt of a small tufted weed, the Channelled Wrack (*Pelvetia canaliculata*), below which the Flat Wrack (*Fucus spiralis*) forms another often well-marked strip of vegetation. Then over the wide middle region are the bladder-weeds, the Bladder Wrack (*Fucus vesiculosus*) and the Knotted Wrack (*Ascophyllum nodosum*), often intermingled, though sometimes one replaces the other. Below them is the zone of the Notched Wrack (*Fucus serratus*) which gives place still lower down to the large oar-weeds (*Laminaria*). These latter are only exposed by the spring tides of new and full moon; they are plants of the shallow water just off-shore and they cannot survive more than an occasional exposure to the air. Besides the weeds just mentioned there are many others, large and small, and they all show zoning to a greater or lesser extent. Animal life is similarly zoned; there are several

different acorn-barnacles which succeed one another down the shore, and there are a number of closely related periwinkles which do more or less the same thing. The vertical range, and the sharpness of its upper and lower limits, vary with the species, and to some extent from shore to shore. Few, however, have so narrow and well-defined a range as has a large top-shell, *Osilinus lineatus*, which at Wembury in South Devon inhabits a strip of shore whose upper and lower limits are but a few feet apart, a small fraction of the total tidal range at that place.

So far a complete explanation of zoning has not been advanced, even for a single species. To say simply that a species is adapted to the level it inhabits is merely to avoid the issue. Lower limits are, in general, more difficult to explain than are higher. It seems likely that higher limits are determined, to some extent at least, by the maximum amount of exposure to sun and air which a species is able to withstand; it extends upwards just so far as this and then dies out. This is fairly obvious for plants like the oar-weeds which cannot reach even the level of low-water neap tides, and there are a goodly number of animal species that come onto the shore from the sea-floor just beyond and range up the tidal slope just so far as their constitution allows. However, exposure to sun and air cannot be a complete explanation in itself for the upper limits of all species, since there are a number, some of the periwinkles for instance, that can remain alive in dry air, or in fresh water, for several days on end and yet do not live on the highest levels. Undoubtedly, quite apart from the influence of the exposure factor itself, the

interactions of one organism with another also influence the positioning of the various species, as in the relations between prey and predator, competition for foot-hold and dislodgment of one species by another, etc.; and the final zoning is the result of a complex of many factors difficult to disentangle and assess.

It is even more difficult to suggest why organisms of fundamentally aquatic types should not extend right down the shore but actually stop before reaching the lower levels. Does too long a submersion in the sea prove harmful to them, just as too long an exposure to the air seems to do? Apparently this is so, but as yet there are very few indications why. Plants, of course, are limited in their distribution by light and it is well known that some species, both terrestrial and aquatic, require more light than others. The lower down the shore a plant lives the less the total light that reaches it, and this is therefore one factor which may not be without some influence on zonation, although, as we have seen, it is improbable that any one physical feature of the environment will furnish a complete explanation of zonation. Hydrostatic pressure has been shown to play a part in limiting the penetration downwards of bladder-weeds whose air-vesicles are damaged by the pressure of water at high tide if they grow too low down; and on shores with extreme tidal ranges (30 feet and over at springs) they cannot grow as far down the shore as on coasts where the tidal range is less.

In connection with the zonation of the larger seaweeds it has been shown experimentally that the rate of water loss is least, and therefore the resistance to desiccation greatest, the higher up the shore a species lives. It has also been shown, but what it



(Above) *The Knotted Wrack* (*Ascophyllum nodosum*) has air-vesicles which float up the fronds when submerged. Where the tidal range is unusually great hydrostatic pressure sometimes plays a part in limiting its downward range on the shore. (Below) *The large top-shell* *Osilinus lineatus* is confined to a narrow strip of shore near half-tide level

Natural size



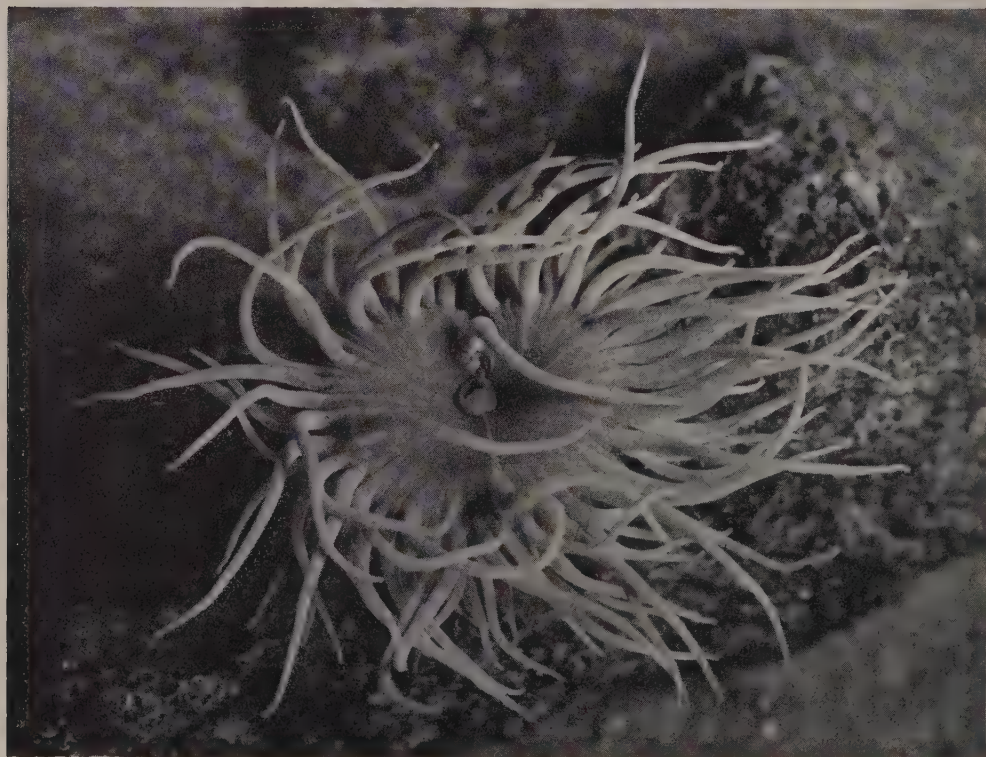
signifies is not clear, that the fat content increases the nearer the seaweed lives towards high-water mark.

Horizontal, or geographical distribution round our coasts varies in the first instance with the physical formation of the shore. The differences between the fauna and flora of rocky, sandy or muddy shores are so obvious as to need no stressing, nor in its wider aspects does the local variation between sheltered areas and those exposed to the full force of the waves, though to this latter feature we shall return in a moment. The geological formation itself exerts an influence on the character of the animal and plant associations living on it, calcareous rocks for instance being on the whole not as favourable to seaweeds as some other types, whilst slates and shales favour a rich crevice fauna. The character of the rock surface, smooth or rough, hard or soft and crumbling, is important in relation to the attachment of plants and sedentary animals, as is also the direction and amount of slope. Much has still to be learnt about the influence of the various kinds of rock on shore life.

All these are factors, however, that bring about quite local changes in the fauna and flora. Much more fundamental differences

in distribution, from the geographical point of view, are to be noted as we pass round our coasts, or as we compare the south-west with the north-east, our warmest shores with our coldest. The difference is quite well seen in the distribution of the sea-anemones, those delightful flower-like animals which so enhance the rock pools and other favoured places. In the south and west there is an abundance of species, but north and east fewer kinds grace the wave-washed border of our land, though to be sure the extreme north-east tip of Scotland harbours an anemone (*Phellia gausapata*) that is not found elsewhere on our island. It is, however, a poor thing in looks compared with the large and brilliant Opelet (*Anemonia sulcata*) so common in the sunny rock pools of Devon and Cornwall, and with the many other beauties of the same district.

Other groups of animals show a similar type of distribution; thus amongst starfishes the Spiny Starfish (*Marthasterias glacialis*) of the south and west is absent altogether from the east where, however, the Purple Sunstar (*Solaster endeca*), unknown on the Channel coast, is to be found in some abundance. Among the true fishes of a north-eastern shore one



Two-thirds natural size

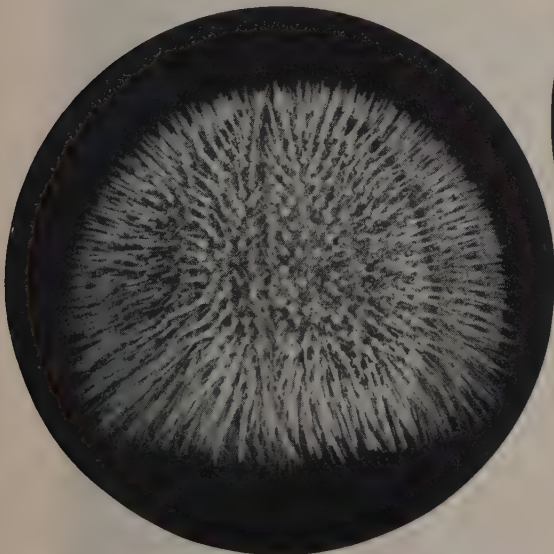
expects to find the Viviparous Blenny (*Zoarces viviparus*) which, as its name implies, gives birth to living young: it is not to be found in the south-west. These are but a few examples of species that do not range all round our coasts, as do perhaps the majority of the commoner shore animals and plants. The main factor responsible for these differences in distribution is undoubtedly temperature, warmer-water species thinning out to the north and east, colder-water-loving types in the opposite direction. Temperature alone, however, may not be the only cause and in recent years another and less obvious geographical, or perhaps we had better say oceanographical, feature has been suggested as an agent influencing distribution.

There is an acorn-barnacle, *Chthamalus stellatus*, which is found in greater or lesser numbers all along the western shores of England, Wales, Scotland and Ireland except for the Irish Sea area north of a line between Holyhead and Dublin. It is absent from the whole of the east coast of England and Scotland, and from the Channel coasts east of Swanage or east of Carteret on the French side. In other words it is present on those shores that are washed by water of the north

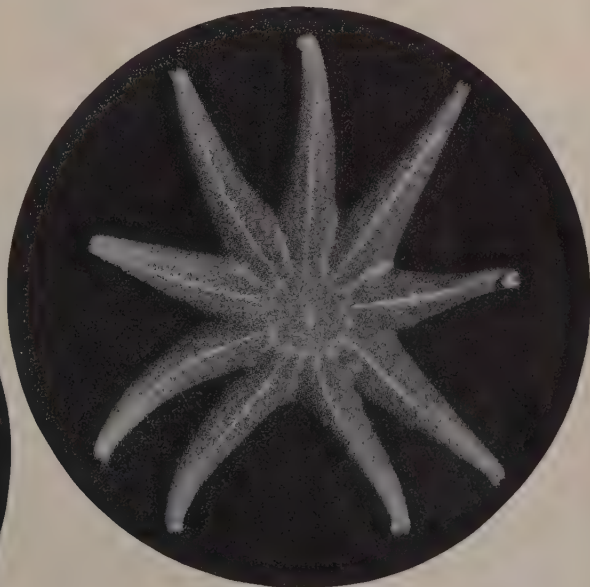
Atlantic and absent from the more enclosed sea areas. At least one other organism seems to show a reaction to the presence of Atlantic water. The Edible Sea-urchin, *Echinus esculentus*, is common offshore all round our coasts but it is only to be found between tide-marks where water from the Atlantic may be presumed to penetrate. The distribution of intertidal *Echinus* thus follows fairly closely that of *Chthamalus*, although not exactly, and there is some overlapping. It is far from clear what it is that makes one water mass more favourable to some species than to others; we can only note the fact that Atlantic water appears to be an environmental necessity for the presence of certain species on the shore just as it is also known to be for the flourishing of some small animals of the plankton (floating and drifting oceanic life).

Chthamalus and *Echinus* are probably not the only organisms reacting to Atlantic water in this way; indeed it has already been suggested that certain Amphipods (Sand-hoppers) come onto the shore, like *Echinus*, in those places to which oceanic water penetrates. As yet, however, we have insufficient detailed information about the geographical distribution of shore animals round these islands for the reaction

(Opposite) *The Opelet Anemone* (*Anemonia sulcata*) is a common and handsome inhabitant of Devon and Cornish rock-pools. (Below) *Edible Sea-urchin* (*Echinus esculentus*), found on the shore in some localities



One-half natural size



One-third natural size

(Above) *The Purple Sunstar* (*Solaster endeca*) is sometimes to be found on the shore in the northern parts of Britain but is not known on the Channel coast



One-half natural size

A Sponge (Halichondria bowerbanki) forming finery processes under conditions of complete shelter from wave action

to Atlantic water to be clearly manifest in these and other animals and plants. It is only in the immediate vicinity of a limited number of marine biological stations and universities that the shore flora and fauna have been thoroughly worked out and listed; in between are long stretches of coast of which we have only fragmentary and sketchy knowledge. It is strange that the work of Professor T. A. Stephenson and his collaborators has given us in some respects a better understanding of the factors underlying the geographical distribution of shore animals in South Africa than we have of our own shores at home, although it is true that they had the advantage of greater ranges of temperature and more sharply defined water masses than are present in our area.

The fauna and flora of a shore are much

influenced by the degree to which it is exposed to wave action. In sheltered localities, such as enclosed bays, straits and so on, there is in general a richer and more varied association than on coasts subject to frequent pounding by heavy seas. Shores facing the Atlantic, as do many of those of north Cornwall, west Ireland and Scotland, are the most severely wave-beaten of all and only behind their outer rocks in sheltered cracks and gullies is there a rich variety of living things. In the most wave-washed regions large seaweeds are in general absent for they cannot survive the fury of the surf. A few strongly attached animals manage to hold on, acorn-barnacles, mussels, limpets and one or two other kinds of firmly clinging and well-streamlined forms. Even some of these may be confined to cracks or



(Left) Collecting Peacock Worms (Sabella pavonina) at extreme low-water spring tides in a sheltered creek in South Devon

(Opposite) Feathery fans of Peacock Worms expanded in an aquarium tank. The white object on the right is a large sea-squirt from the same habitat

to angles in the rocks where, perhaps, their larvae at the time of settling sought the relative shelter of such depressions, leaving bare areas where apparently nothing seems able to endure the forceful rush of water. It is as though in our seas there is lacking a species completely adapted to surf conditions, an ecological niche untenanted and to let. In some tropical and semi-tropical countries surf-washed rocks are very thickly populated by a dense mass of tightly clinging sedentary animals able to withstand terrific battering.

Shores that are well sheltered nearly always show a rich and varied assortment of animals and plants, often delicate and fragile species. In some unusually quiet places, as in docks (provided the water is not too foul) or in almost landlocked arms of the sea, certain sponges, which in rougher situations grow as flattened plates closely adherent to the rocks, produce long soft finery outgrowths and may be branched and rather shrubby. Only the absence of wave-shock allows such growth to take place. With them may be found animals that avoid disturbed water, slender-legged spider crabs, fragile feather- and brittle-stars and large soft sea-slugs of various sorts. The particular species present depend on the situation, whether rocky or shingly, sand or mud. One thoroughly landlocked sea area on the south coast of Devon supports an amazingly large variety of mud-loving types in great abundance. Amongst these may be singled out for special mention the beautiful Peacock

Worm (*Sabella pavonina*) which builds for itself a tough tube of cemented mud. On a few days in the year, when at low tide the sea drains away further than usual, hundreds of tubes of this species are to be seen sticking up out of the soft mud into which one's sea-boots sink half-way up to the knees. It is an amazing sight which would be more amazing still were we able to get a fish-eye view when the water covers them once more and each worm expands at the mouth of its tube a beautiful feathery fan, with which it collects the minute swimming organisms on which it feeds, and the mud particles with which it builds its home. Only in perpetually calm waters can such delicacy flourish and multiply abundantly.

Sunshine and rain, calm and storm, these are the great climatic factors which mean so much to, and influence so greatly, the living things of the shore. As we trace their effects, first here and then there, we feel that we are beginning to understand something of the tangle of life as it is manifested in that most constantly changing of all environments—the seashore. As yet we can hardly be said to have made more than a beginning and more than has so far been accomplished remains to be done. As the years go by and more and more facts are accumulated, much that is at present obscure and mysterious will yield to the cold light of scientific reasoning, but the fascination of the shore to those who have learnt to know and to love its many moods will for ever be the same.

One-half natural s



Old Swiss Maps and their Makers

by RENÉ ELVIN

THE would-be tourist inquiring at the Swiss Travel Agency about the prospects of holidays in Switzerland is often presented with a map of that country which will fascinate him if he is a layman and enthrall him if he has a taste for cartography. This modern commercial example of Swiss map-making is in line with a tradition going back many centuries and built up by a series of personalities as interesting in themselves as are the maps with which they made cartographic history.

Thus it was a Swiss, the Zürich physician Konrad Dürst, who produced in 1495 the earliest detailed map of a whole country. The oldest atlas known was published in 1552 by another Swiss, the chronicler Johann Stumpf, and yet another Zürich cartographer, Hans Konrad Gyger, drew in the 17th century the first maps based on exact surveys and scientific triangulation.

There are many reasons for this early pre-eminence, which has been largely maintained to this day. One is the relatively high degree of civilization early attained by Switzerland, thanks to the influence of great religious in-

stitutions such as the Benedictine abbeys of Saint Gall and Einsiedeln, which, as early as the 8th century, made that country one of the chief seats of learning and education in Europe. Another is her strategic position commanding the main Alpine passes and, with them, the thriving transit trade which through the ages peregrinated over the great European divide: to find his way among the fearsome craggy defiles, the traveller needed some kind of chart when he could not have a living guide.

No less imperious reasons for map-making were provided by the political conditions prevailing during the 14th and 15th centuries in Europe: at that time, after defeating the Austrians at Morgarten, Sempach and Nae-fels, the mighty Charles the Bold at Grandson and Morat, after forcing the French to retreat at St Jacob an der Birs and the Emperor Maximilian at Calven, the Swiss were the foremost military power in Europe. They not only asserted victoriously their independence, but were eager to extend their territory. It was only after the fierce, bloody battle of



The Zürich Navy, having sustained defeat in one of the numerous internecine strifes which preceded the establishment of the full Swiss confederation, retreats to the safety of its home port. This picture, by Werner Schodoler, and that opposite, by Diebold Schilling, are reproduced from Die Schweizer Bilderchroniken (1941)

At the time of Swiss military pre-eminence, in the 15th century, unemployed Helvetic soldiers (or Gugler) invaded Alsace and watered their horses in the Rhine at Strasbourg

Marignan in 1515 that they renounced their ambitious dreams of Empire and retired to their mountain fastnesses, leaving their young manhood to be hired as mercenaries by the highest bidders.

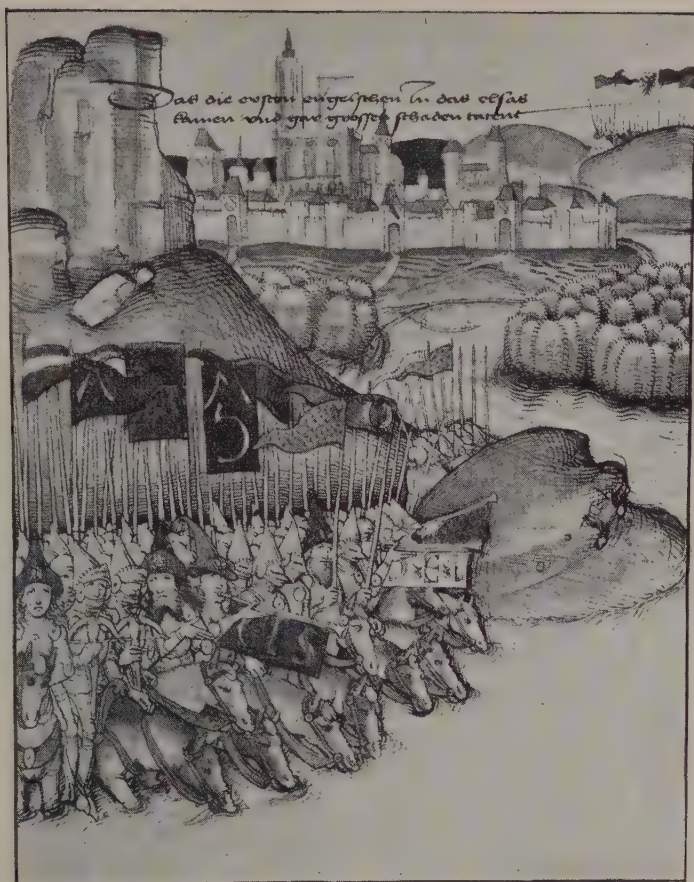
Now maps are as indispensable in war as are armaments, and when, in Goethe's *Faust*, Mephistopheles pronounces war, trade and piracy to be an inseparable trinity:

Krieg, Handel und Piraterie,
Dreieinig sind sie, nicht zu trennen,

he might, with greater accuracy, assert that cartography is the necessary companion of both warfare and commerce.

They certainly proved interrelated in the early Renaissance in Switzerland. That period coincided with the appearance and flourishing of some of her best painters, like Konrad Witz, Urs Graf and Niklaus Manuel, who count among the earliest of landscape artists. They were the first, with Albert Dürer, to discover the art of limning the countryside by bold lines and cross-hatchings of the pen, an art which found its immediate application in the technique of early Swiss map-makers. In their naïve designs, topographic details such as houses, gardens or hills are shown not only in their ground-plan, but also in their elevation, as in modern monumental maps. This gave the cartographer ample occasion to display his skill and is one of the reasons of the perennial charm their ingenuous designs hold for us today.

The popularization of these maps was powerfully helped by the flowering of printing in the early 16th century in Switzerland. Typographers like John Amerbach and John



Froben at Basel and Christopher Froschauer in Zürich, were not only acknowledged as outstanding craftsmen, but also as venturesome publishers. Froschauer, who edited and printed Johann Stumpf's first geographical atlas, also published the revolutionary books of Luther and Zwingli which heralded the Reformation, as well as the first English Bible, of which a copy may still be seen at the Bodleian Museum at Oxford.

The development of map-making in Switzerland followed, and was partly parallel to, the unique series of Helvetic illustrated chronicles, which are probably the most vivid, authentic and attractive historical documents of that period. The chronicles of Benedict Tschachtlan, Diebold Schilling, Gerold Edlibach, Werner Schodoler and Johann Jacob Wick have few equals in pictorial history for pitiless realism, sardonic humour and artless charm. Long forgotten in private or public archives, they have only

been unearthed and published in the past few decades. A beautifully produced, skillfully selected and commented anthology of these fascinating colour plates was recently published in Switzerland (*Die Schweizer Bilderchroniken des 15./16. Jahrhunderts*. Atlantis Verlag, Zürich), while a comprehensive, exhaustively documented study of old Swiss maps is now available (Professor Dr Leo Weisz: *Die Schweiz auf alten Karten*. Verlag der Neuen Zürcher Zeitung, Zürich).

Rather than specialists, the humanism of the Renaissance tended to produce universally developed personalities, whose learning often covered the whole body of knowledge of their time. Konrad Dürst, for instance, the author of the earliest map of Switzerland that has come down to us, was a doctor of medicine, an astrologer, a geographer, an historian, as well as a cartographer. Like his better known compatriot Paracelsus, he was a romantic and rather mysterious figure. He was born in 1450 as the illegitimate son of the precentor at the church of Fraumünster in Zürich and of his cook. After being apprenticed to a goldsmith (like his contemporaries Donatello and Michelangelo), he turned to the study of medicine, becoming in turn medical officer of his home town and physician in ordinary first to the Duke of Milan, Lodovico Maria Sforza, then to the Emperor Maximilian I. He seems to have been a man of somewhat expensive tastes, and not overlaid with punctilious scruples in financial matters: having had a large number of sumptuous garments made on credit on the strength of his court appointment, he appears to have still owed for them when he died years later—in 1503—in Mol-

davia, where he had been sent by his imperial master to attend a local prince. His map of Switzerland is picturesque, crude and uneven: while the central part is depicted with fair accuracy, the outlying districts are treated with fine disregard for topographical proportions.

A much better map, indeed a masterpiece combining the liveliness of a battlepiece with an already acute sense of orthographic projection, was that published a few years later by an unknown artist signing himself "P. W." and sometimes supposed to have lived in Cologne. It is a vast panorama of the war waged in 1499 by Switzerland against Emperor Maximilian, and its large dimensions (56 inches by 24) are filled with a variety of briskly drawn scenes. We see the several engagements of the campaign outlined with brilliant verve. Knights in full panoply are on the march, their banners making a brave show; *lansquenets* are piercing each other's throats with their halberds; a naval encounter is taking place on the Lake of Constance; a battery of cannon is being brought into action against pikemen. Meanwhile civilian life goes on peacefully; deer hunting is in progress, fishing boats are trailing their nets, monks are seen in their monastery, etc. All the figures are designed with loving care and with a mastery unequalled in any contemporary map, and the whole work is a fascinating document that unfortunately loses many of its details in smaller reproductions.

In those spring days of learning, geography, or, as it was then called, cosmography, was in the air, but nowhere did it receive more intensive attention than at the tiny court of



(Left) Section of the earliest map of Switzerland by Konrad Dürst, end of the 15th century. The section shows Central Switzerland, with the Lake of Lucerne

(Opposite) A masterpiece of early map-making is this lively picture of the 'Swabian War' of 1499, in which the Swiss defeated the forces of Emperor Maximilian and definitely ensured their independence. The Rhine is shown pursuing its own turbulent path across the Lake of Constance



René, duke of Lorraine and Bar, and nominal king of Naples, Sicily and Jerusalem. Under his wise government Lorraine flourished, and his capital at Saint-Dié became for a time the centre of scientific research in Europe. His secretary Walther Lud was specially interested in cosmography and called to Saint-Dié two young specialists in that science, Martin Waldseemüller and Mathias Ringmann, founded a printing house, and ordered the publication of a new edition of the works of Ptolemy, the ancient Greek mathematician, astronomer and geographer whose authority on these subjects was then as much respected as was that of Aristotle in philosophy. The duke, besides lending financial support, himself took part in the undertaking, supplying much geographical material, notably concerning the then recent discovery of America, about which he had heard at first hand from Amerigo Vespucci. (Incidentally, it was Waldseemüller who coined the name of 'America' for the new continent.) One of the first-fruits of their labours was the earliest printed map of Switzerland, in all essentials a copy of Dürst's work, with some mistakes added.

After the death of the duke of Lorraine, the school of Saint-Dié disintegrated, and the good work was taken up in Switzerland. Here flourished among others three humanists, Joachim von Watt (known to the learned world of his time as Ioachimus Vadianus), Heinrich Loriti, known as Glarean, who was the first to construct a terrestrial globe on scientific principles, and his great pupil Aegidius Tschudi. They were as versatile as most of the other humanists of that astonishing epoch: though history was their main subject, they were also cosmographers and

keen theologians; Vadianus was a physician, and Tschudi an able diplomatist and statesman, with some claims to have made, as well as written, history. Aegidius (or Giles) Tschudi (1505-72), scion and most illustrious member of a distinguished family, was chief magistrate or *landamann* of his native land of Glarus and ambassador to the Emperor Ferdinand, but his chief title to fame is the history of Switzerland he wrote as a young man of twenty-three, in Latin and German, under the title *De prisca ac vera Alpina Rhaetia*, or *Die uralt wahrhaftig Alpisch Rhetia*. Not a very reliable historian by modern standards, his chronicle is mainly remembered by the fact that it gave literary credence to the traditional legend of William Tell, who through him became for centuries the symbol of freedom overcoming tyranny and was eventually immortalized by the genius of Schiller and Rossini. Tschudi, a passionate patriot and collector of national antiquities, travelled all over Switzerland in quest of historical and geographical data, which he used for his great map of that country and for the full commentary that went with it.

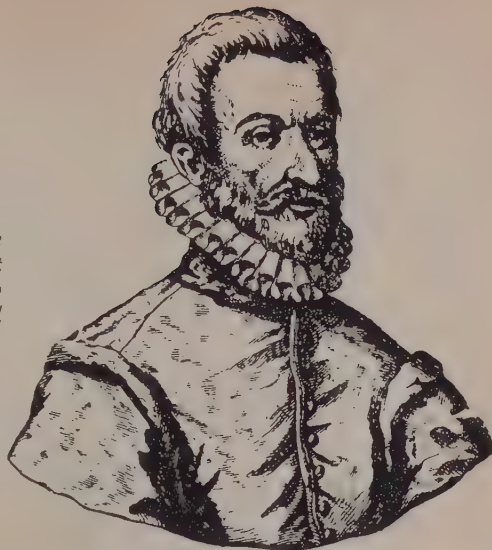
This map, engraved and provided with a beautiful heraldic frame probably drawn by Holbein, was published in 1538 as a mural chart by Tschudi's disciple Sebastian Münster, and immediately became one of the most popular cartographic works of that period. It was the first attempt to represent with some exactness the orographical shape of the country, and it remained for a long time the map of Switzerland *par excellence*.

Sebastian Münster (1489-1552), who was professor of Hebrew and Greek at the University of Basel, was first attracted to cartography by his admiration for Tschudi's map.

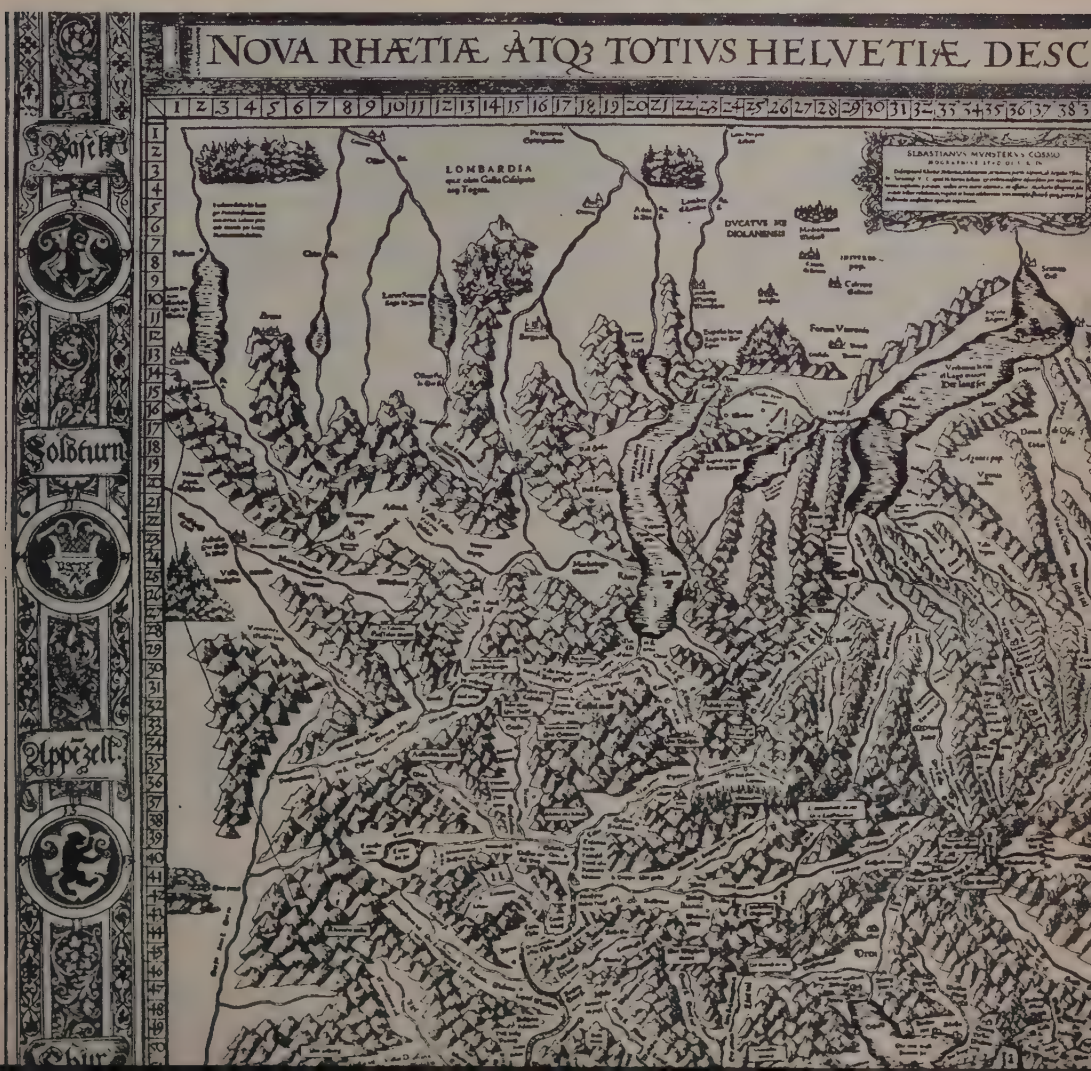


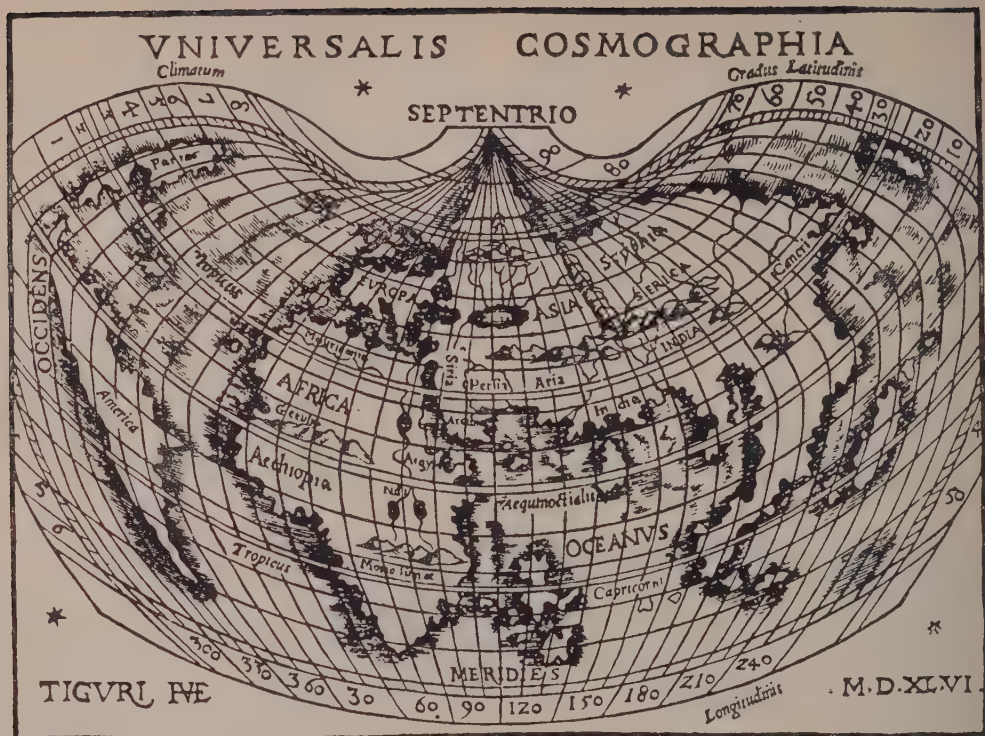
(Opposite) Section of the first printed map of Switzerland, drawn about 1508 by Martin Waldseemüller and first published in the Strasbourg edition of Ptolemy's works (1513)

(Right) Aegidius Tschudi was not only the most eminent cartographer of his time, but a notable historian who gave literary credence to the legend of William Tell



(Below) One of the most celebrated and copied maps of Switzerland, made by Aegidius Tschudi and published in 1538, with a beautiful heraldic frame probably drawn by Holbein





Being also a learned mathematician, he was the first to apply astronomical mensurations to cartography, and his *Cosmographie* remained for many decades the standard work on the subject.

Tschudi's work was also instrumental in determining the vocation of another of his followers, Johann Stumpf (1500–78). Born in Bruchsal near Karlsruhe, he was one of the many Germans of that time who adopted Switzerland—even then a place of refuge against despotism and intolerance—as their own country. Going over to Zwingli's doctrines, he was appointed pastor of two communities in the canton Zürich, but, though he took seriously the duties attached to his preferment, his amazing industry allowed him to compile single-handed the most voluminous and detailed historical and geographical description of the Confederation yet published. His *Beschreibung gemeiner loblicher Eydgnoschaft Stetten, Landen und Völkern chronickwürdiger Thaten* was published in 1548 by Christopher Froschauer in Zürich as a huge folio of 934 pages with many fine woodcuts and maps, including the first historical map ever printed. Four years later Froschauer brought out the maps

separately in what was not only the first complete atlas of Switzerland, but also the first national atlas to be produced anywhere. It was a notable event: it proved a powerful stimulant to geographical efforts; incidentally, it preceded by a quarter of a century Christopher Saxton's great survey of England and Wales.

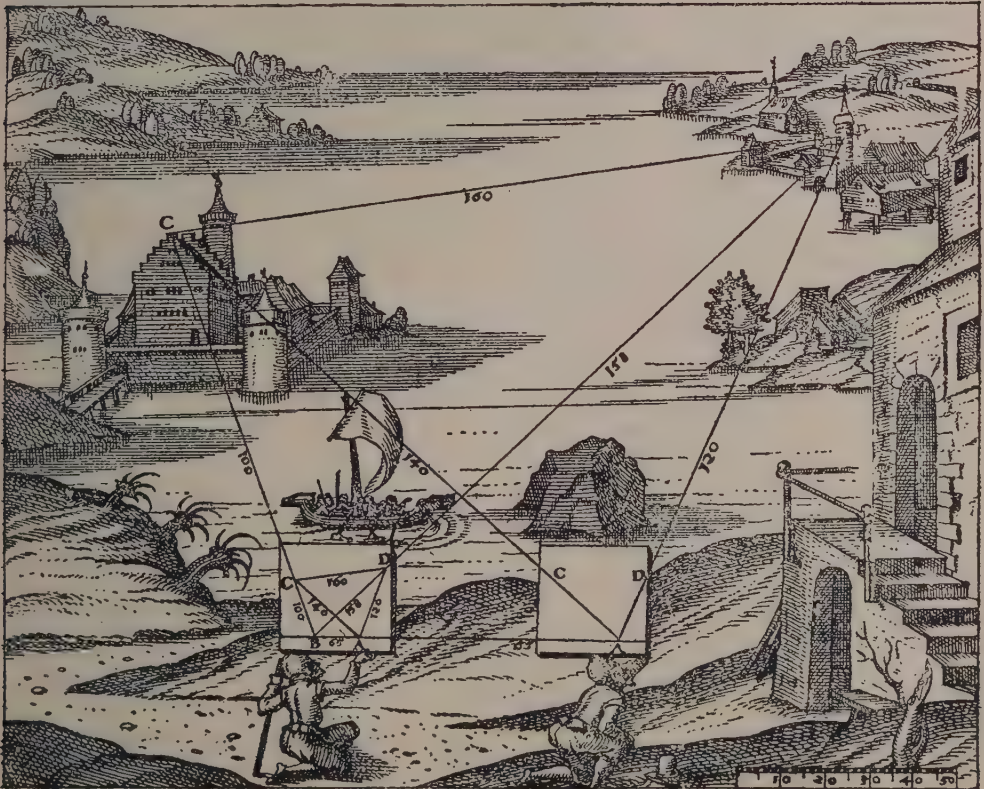
Throughout the 16th century Tschudi's map held sway, being copied and pirated all over Europe, even by the famous Flemish geographer Gerardus Mercator. The next step had to wait for further developments in the field of mathematical science and surveying technique, in which much research was made at that time in Switzerland, particularly in Zürich, Basel and Geneva. The Swiss engineer and mathematician Jost Bürgi (1552–1632) invented logarithms independently from, and probably before, the Scotsman John Napier. Two other Zürich engineers, Philipp Eberhard (1563–1627) and Leonhard Zubler (1563–1609), perfected the first telemeter, while Zubler and Bürgi together devised the method of triangulation, i.e. the measurement of a territory by tracing a series or network of triangles from a base-line and determining their sides and angles.

(Opposite) Title-page of the atlas edition of Johann Stumpf's description of the Swiss confederation. This, the first national survey of any country, was published in 1552

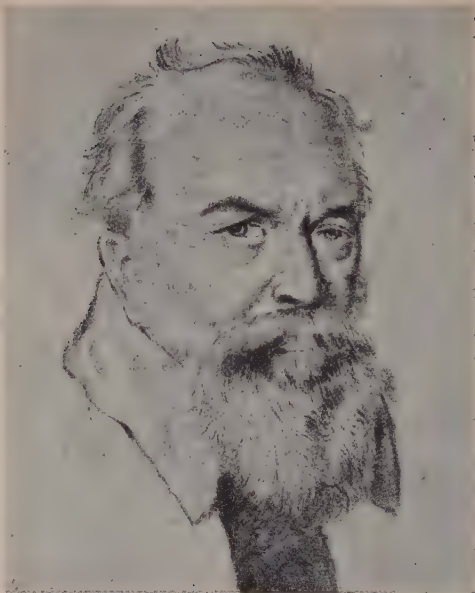
(Right) Jost Burgi (1552–1632), Swiss engineer and mathematician, inventor of logarithms, whose work was fundamental in devising the art of exact surveying by triangulation



(Below) An early demonstration of the technique of triangulation, from *Fabrica et usus Instrumenti Chorographici* (1607) by Leonhard Zubler, inventor of the telemeter



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"Sonderdruck aus der Monatsschrift" (Atlantis Verlag)

Hans Konrad Gyger of Zürich (1599–1674)

It was by using this method that Hans Konrad Gyger became the pioneer of modern cartography. Born in 1599 in Zürich, the son of a painter on glass, he first followed his father's trade, but became attracted to a brilliant circle of Zürich technicians and artists comprising, besides the men just mentioned, the surveyor and cartographer Josias Murer, his brother the etcher Christoph Murer, and the young landscape-painter and topographer Matthäus Merian, whose panoramas of European cities are still among the most valuable pictorial documents of that period. In this congenial environment Gyger's talent developed early, and he was barely twenty when he and some of his friends were commissioned by the Zürich Government to draw up a detailed map of north-east Switzerland. Eventually the map was in fact designed by Gyger, and this first attempt already far surpassed all previous charts for accuracy and beauty.

From then on, and for the next fifty years, Gyger was actively engaged in designing maps, panoramas for his friend Merian, plans of fortifications for his native town, surveys of other Swiss cantons and of Switzerland at large, all becoming progressively more exact in their topographical details, neater and better proportioned in their delineation, and more dignified in their lettering. Then, towards the end of his life, without any official encouragement, he



Matthäus Merian of Basel (1593–1650)

decided to round off his career by achieving his masterpiece on the very theme with which he had started it: he designed a new map of the canton Zürich, embodying all his experience and knowledge, which he presented to its government.

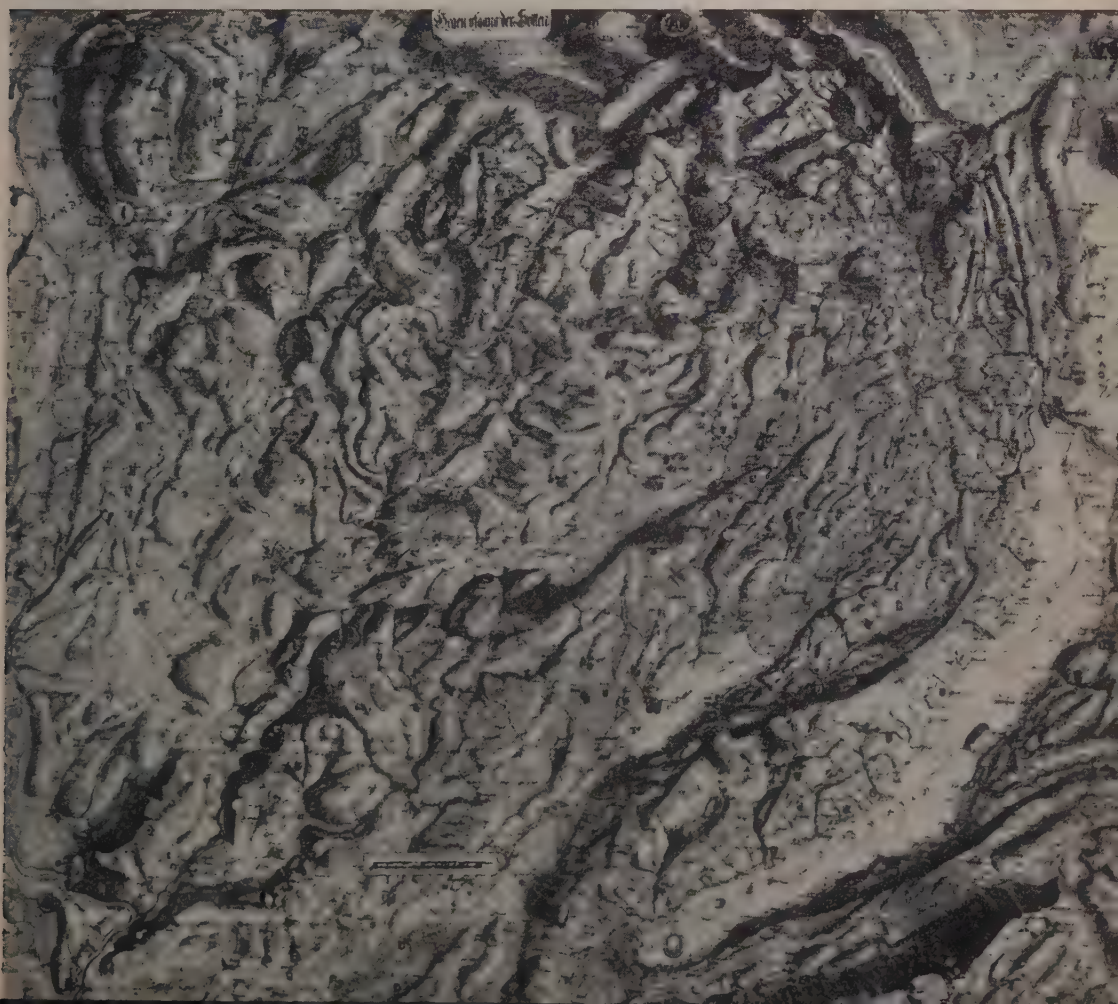
For nearly two centuries Gyger's *magnum opus* remained unequalled for accuracy, while for beauty it can bear comparison with any map published down to our time. Repeatedly scrutinized by modern cartographers, its errors have been found not to exceed 1-1½ per cent, a margin of astonishing narrowness, considering that triangulation was then in its infancy and that Gyger had no previous model to draw upon.

For a long time Gyger's masterpiece remained unique—not only on account of its relative perfection, but also because its very accuracy would have made it a dangerous weapon of war in the hands of a possible enemy, so that the Zürich Government decided to keep it a state secret.

Gyger's map also showed for the first time a workable solution of the problem of depicting the third dimension of height on a two-dimensional design. Where before him cartographers were content to show mountains as ill-defined cones in full elevation, Gyger was the first to show them in their true proportions by means of vertical shading, giving even an approximate representation of the gradients of the slopes.



(Above) Section from a map of the frontiers of Canton Zürich, by Konrad Gyger, drawn in 1655. (Below) Gyger's masterpiece: Relief map of Canton Zürich—the first map with 'modern' relief representation and a marvel of accuracy for its time (1667). Beautifully drawn and lettered, it is exact within 1½ per cent of error



Section from the Atlas of Switzerland by the Strasbourg cartographer Johann Heinrich Weiss (1759-1826) made with the collaboration of the Swiss mountaineer, Joachim Eugen Miller



All pictures, with the exception of four, reproduced from "Die Schweiz Auf Allen Karten" (Verlag der Neuen Zürcher Zeitung)

After Gyger's death in 1674, cartography declined in Switzerland, and though the Zürich physician and mathematician Johann Jakob Scheuchzer (1672-1733) did draw up a map of the country which remained long popular, but which was hardly an advance on his predecessor's work. Other maps were made by foreign scientists such as the French academicien Guillaume Delisle (1675-1726), the Englishmen J. Roberts, Samuel Dunn and William Coxe, the Germans Matthäus Seutter (1678-1757) and Johann Baptist Homann (1663-1724), but no real progress was made until the end of the 18th century.

At that time, war once again proved the most potent incitement to map-making. Soon the campaigns of the French Revolution and of Napoleon's Empire were to make Switzerland a battlefield. Meanwhile French and Swiss engineers began to design maps which formed the first step forward since Gyger in the representation of relief. The finest cartographical work of that period is the Swiss atlas drawn up by the Strasbourg topographer Johann Heinrich Weiss (1759-1826) on behalf and at the expense of the Swiss merchant and Alpinist Johann Rudolf Meyer. Weiss was not a pleasant character: he conveniently forgot the help he had received from his sponsor and the valuable collaboration of his assistant, the Swiss mountaineer Joachim Eugen Miller (1752-1833), to whom he owed much of the strikingly

beautiful design of heights and valleys. Nevertheless his work remains a turning-point in the history of cartography. It was widely copied, particularly by Napoleon's military engineers Louis-Albert Ghislain, Baron de Bacler d'Albe and Jean-Baptiste Raymond. The latter's *Carte topographique militaire des Alpes*, drawn up in 1803, but only published in 1820, was the best available Alpine map until the publication of the Dufour map.

Guillaume-Henri Dufour (1787-1875) was one of Switzerland's greatest soldiers and most eminent men. As general of the Swiss Federal Army, he reduced in 1847 the revolt of the Catholic cantons with exemplary rapidity and humanity. In 1833 he was commissioned by the Swiss Federal Diet to superintend the execution of a complete trigonometrical survey of Switzerland. The work took thirty-two years, and was accomplished with complete success. The map, in 25 sheets on the scale of 1:100,000, was published at intervals between 1842 and 1865, and was at the time as much in advance of contemporary cartography as had been Gyger's Zürich map two centuries before. Its mensurations were so accurate that they served as basis for the present Ordnance Survey of Switzerland, the *Siegfried Atlas*, itself one of the most remarkable works of its kind, whose sheets are well known to British mountaineers today.

Rebuilding Greece

by KENNETH MATTHEWS

On December 31 the work of UNRRA, as an organization, officially comes to an end. But in many countries its international task of relief and rehabilitation is far from complete. Greece is one of those countries; and the following article by the Balkan correspondent of the B.B.C., with illustrations of UNRRA in action, shows how much has been accomplished and yet how insecure are the foundations on which the structure of a stable Greece has still to be raised. Can the Greeks do the job alone? If not, who is to help them? More will be heard of these questions in 1947

ALL the church bells were ringing during those late September days of 1944, when the first British forces landed in southern Greece. I remember how our white-winged Dakota swept out of the moonlight, across the blanched Arta marshes, to touch down on the extreme tip of the Peloponnese, the air-strip of Araxos, nobody knowing for certain whether we should get a hostile reception or not. The troops in the aircraft, the stout-hearted parachutists, had not even been told where they were going. Then from far away the sound of bells caught the ear. It seemed like the promise of a quick deliverance. A few days later, Patras, the fourth biggest port of Greece, reverted to friendly hands without a blow. We found the quayside littered with the red dynamite sticks which the wily Greek harbour-master and his assistants had plucked from their crevices before they could be exploded. That, too, seemed a good omen. Alas! Patras was the first and last undamaged port which we were to find in Greece.

As we progressed towards Athens, we were left in no doubt that the enemy had spared Patras by accident, not by intention. Every road bridge had been destroyed; the railway was so smashed up that one of Colonel Jellicoe's transport officers said to me: "It will be ten years before that railway runs again, if it ever does." (It is running now.) At the Evil Stairway, where the legend says a giant lay in wait to cast travellers down the cliff, the Germans had blown up the viaduct and toppled fifty goods waggons and several locomotives over the edge into the sea. Athens itself had few ruins to show; but the people were like ghosts walking. It may have been a superficial sign of hardship; but nothing depressed me more than the coffee-house tables, sprawling empty over the pavements, while the endless Athenian crowd passed by. The famous beaches outside Athens were even more desolate: tenanted only by barbed wire and minefields. Most people in this maritime city had to count back years for their last sight of the sea.

(If we measure recovery by the same standards, the coffee-house tables are brimming over again with customers, although the coffee costs sixpence compared with the pre-war penny, and the beaches are so black with picnickers that in summer you can travel for twenty miles along the coast in search of a little elbow-room to bathe.)

Piraeus, the port of Athens, had been dynamited; and it was upon this port that the population of the capital, swollen by refugees to nearly a million and a half, depended for their food supply. The Royal Navy, helped by the minesweepers of the Greek Navy, cleared a channel, and within a few days food-ships were tying up at the quayside. It was estimated that 300 tons of food a day would have to be distributed in the capital area to keep the people alive; and this was achieved, despite the fact that every item of cargo had to be man-handled from the ship to the warehouse. But the Germans had reserved their masterpiece of demolition for northern Greece. The great port of Salonica might have been swept by an atomic blast. Cranes, warehouses, and even the solid concrete of the quays, had been smashed and poured on top of one another in one vast rubble-heap. All this had been done by a German sabotage party, about seventy strong, who had been left behind by the retreating German army; and it was done under the eyes of a handful of British officers watching from the hills, who complained bitterly that determined action by local partisan forces could have saved the port. As it was, it looked like the death sentence for many parts of Macedonia, which could only be fed from the sea. Six months later, a British Major of Engineers was proud to be able to show me a single quay, reconstructed under his command, at which ships of 10,000 tons could unload, without going through the slow and cumbersome procedure of discharging into lighters.

The ghastly trail of burnt villages ran from one end of Greece to the other. Koropi, with

7000 people in the Attic plain, was still smoking when I saw it. The wine-vats in the basements had burst with the heat and saturated the village in the odour of a drunken brawl. A German signals unit had been ambushed here by partisans, and the wholesale arson was by way of reprisal. The houses were absolutely uninhabitable; and families were living out-of-doors in improvised sheds like chicken-coops. I passed several burnt villages on the main road through the plain of Thessaly. Some of the storks' nests on the roof-corners had survived: bizarre sight, the storks perched up among the ruins, peering upon the desolation. Arakhova, where Saint George is said to have appeared to the German commander and ordered him to stop burning; and Lechovon, where the mayor was living in one intact room with his nine children: these were places where they rang the bells on the liberation, and when the first British troops arrived, they brought them presents of honey and fruit.

Yet I suppose the material destruction was one of the lesser evils. In an orphanage near

Athens, a ten-year-old boy was pointed out to me who in one night had seen his mother killed and his father executed by machine-gunning. When the boy had been first brought in, he used to wake up at night, screaming. The matron asked if I would like to hear him tell his own story, and despite my reluctance to drag the child through so dreadful a tale, I was persuaded to listen. At Patras, the President of the Greek Red Cross wanted me to visit a young girl who had lost her reason after seeing her family executed; but I was only too ready to take that tragedy upon trust.

The hunger which scourged Greece is too well-known to need further description. I shall mention only the bearded children of Sira, who had already run through their lifespan and were prematurely old at ten or twelve. (Sira is still one of the 'black' districts in the UNRRA list; as late as last June, a wheat ship bound from Vancouver to Liverpool was urgently diverted to Greece and after unloading half its cargo at Salonica, proceeded to Sira to discharge the other half.)



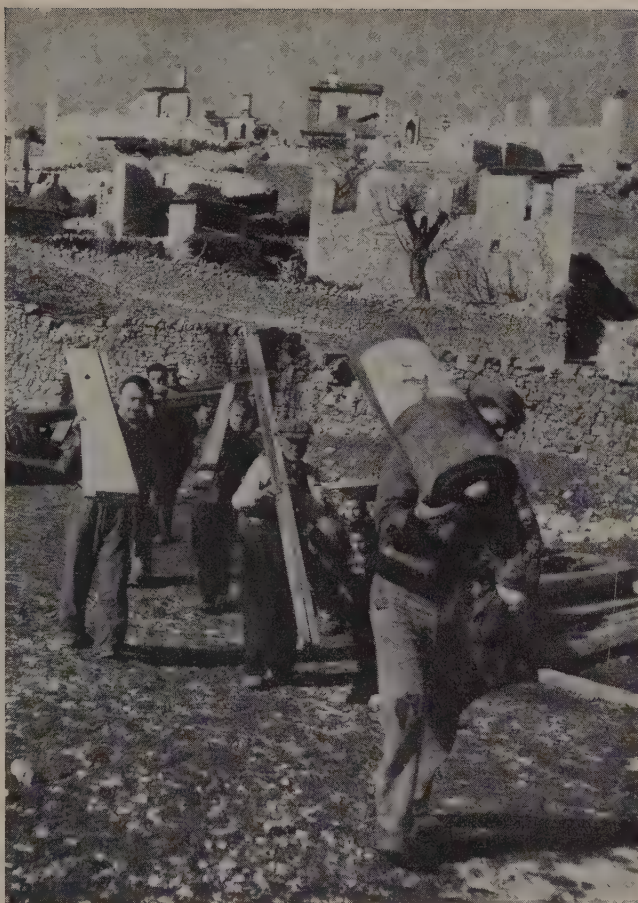
Stanford, London

This was the situation with which the British Army wrestled for the first six months and UNRRA for the next eighteen.

However, neither the Army nor UNRRA had to start from scratch. Ever since the famine of 1941, the International Red Cross had been active in Greece distributing supplies, of which an important part was Canadian wheat carried in Swedish ships. The first supplies unloaded under British military supervision at Piraeus were from Red Cross ships. But the Army at once flung its whole organization into the business of saving life. Lorry drivers were out on the broken mountain roads for fifteen hours at a stretch, for there was no other means of transport. Young captains and lieutenants constituted themselves Officer Commanding Electric Light, or Officer Commanding Town Drains, in the leaderless provincial cities. They made the best of two contradictory directives: the first, "Every wheel of Greek industry must be set turning"; the second, "No money must be spent except on actual military necessities". Wherever they came, the price of a tin of bully-beef fell within a few days from thirty shillings to three-and-sixpence. They were bitterly indignant (as UNRRA were to be later) when profiteers held up olive oil or set a price

of fifty pounds a ton on the carriage of goods by sea from Crete to Piraeus. One officer I knew appealed to a government department to requisition a piece of machinery essential to start a factory working. The bureaucrats were horrified. "But that would be Communism," they told him.

Practically all functions of government had ceased in Greece; the new central government in Athens had no revenue, no arms, no representatives in the provinces—in short, no power. The first attempt to bring the country under central control—the disarmament of the partisans—caused civil war in the Athens streets. One got the impression that the civil



All photographs by courtesy of UNRRA

Material being brought in for the erection of emergency shelters in Asprangeloi, a village in the Pindus mountains. This village lay in the main area of guerrilla warfare in Greece and was twice burned by the Germans, in September 1943 and in January 1944

war knocked down what little the Germans had left standing. For example, the Germans had spared the Athens-Piraeus underground railway; the revolutionaries promptly put it out of action. They also blew up several of the remaining factories. But once again it was the human sacrifices which were the most tragic aspect of the civil war. I have burnt into my mind the sight of those frightful execution grounds on the outskirts of Athens where the victims of the mass executions were being exhumed: the stench of the bodies, the shrieking and wailing of the mourners, the children wandering unchecked looking at everything, and at my side the Government Chief Patho-



(Above) The first train passing over a reconstructed bridge on the Athens-Khalkis line. Out of 1600 miles of railway track, 1000 were wrecked during the war. Almost all are now in working order, with the notable exception of the trunk line to Europe. (Below) Mules and donkeys have been the chief livestock imports. They are needed for the transport of supplies in all country regions





A woman carrying supplies on her back, while a man walks unencumbered beside her. The author recalls a case where an UNRRA girl worker received a deputation of men, complaining that their wives had to walk 20 kilometres with UNRRA loads on their backs. When she asked them why they did not do the carrying themselves they were horrified. This attitude towards women is, however, dying out

logist turning over the decomposing corpses with his stick, to show me the mutilations. Any analysis of the civil war lies outside the scope of this article; but two things are worth pointing out. The massacres in Athens were only the much-publicized climax of a murderous vendetta which had already claimed thousands of victims throughout Greece. And, secondly, it is misleading to say that the massacres were planned; they were rather the accompaniment of a total social collapse in which leaderless passions and hatreds boiled to the surface and murdered and laid waste.

UNRRA entered into office in Greece on April 1, 1945, after a short trial run and one major reconstruction of staff. It was less than a month after the surrender of arms by the ELAS partisans. Chaos still reigned in the countryside. A few Army officers with experience of Greek relief work lingered on for a while at their posts. Also scattered about the country were a hundred-odd voluntary

workers, almost all of them British. Some were young men of the Society of Friends; others were that extraordinary product of England, the middle-aged heroines in badly-fitting tweeds who, knowing no Greek and innocent of politics, were bathing, dosing and clothing the war-stained children of Greece in defiance of discomfort and all obstructions. UNRRA were sometimes criticized for not going out to the people; but this was a misunderstanding of UNRRA's function. UNRRA were not even responsible for the distribution of supplies; once the goods were on the quayside, the disposal of them rested with the Greek Government. UNRRA could only observe, report—and advise.

They began with a 250-million-dollar import programme; and a Greek Committee sat at the National Bank to decide what goods should be included in the imports. For example, if an optician wanted to renew his stock of lenses, he wrote to the Committee, who then decided whether these lenses would



(Above) Barefooted children in the Pindus region. All over Greece, shoes are one of the chief needs. UNRRA has, however, made provision for feeding the children; and the children here seen are getting one hot meal at school daily. (Below) School in the open air at Stroumi, near Yannina. There are dozens of schools like this in Greece, but there are no text-books, no exercise-books, and even a pencil costs as much as two eggs



fit into their general programme or not. Afterwards, in the light of experience, UNRRA imports became much simplified. One spoke of "the bread ration" instead of "food rations", because bread was found to be the only item of food which the people could be relied upon to eat themselves. Other foods were either not bought (because they were too expensive) or bought and sold again, to reappear upon the Athenian market-stalls and offend the sight of many Englishmen who could not understand why they could buy unlimited quantities of foods which were practically unobtainable at home. Sugar was a frequent cause of scandal. The sugar ration in Greece was never more than half a pound per person per month; but active agents of Athenian pastrycooks toured the provinces and bought the sugar in, to resell in the shape of fondants and meringues at prices upwards of ten shillings a pound. In the same way, UNRRA rehabilitation plans gradually concentrated upon the revival of Greek agriculture. The rebuilding of houses would have required a Five-Year Plan; and the effort to revive industry failed, some said because labour could not be got, others said that the industrialists were too stiff-necked and could not come to terms with the Government. Anyway, goods imported by UNRRA for industry simply piled up in the warehouses; and speculators waited for the day when they would be disposed of as scrap.

A serious monetary inflation was the next of the troubles which afflicted the Greeks. There had, of course, been a runaway inflation of the old currency at the time of the liberation, when street hawkers carried sackfuls of 10-billion drachma notes to pay out their small change. The new currency, printed in England, had been valued at 600 drachmae to the £, at which rate a single-sheet newspaper cost eightpence. The government of the day issued the new notes recklessly, on a free market where goods in short supply went to the highest bidder. For once, the economic experts were unanimous. Somebody in Greece had to do some responsible book-keeping, balance the budget, ration necessities and control prices, as was done in every other country at war. The job was given to a banker, Mr Varvaressos, who had studied the British rationing system on the spot. He imposed an ingenious tax on rents and produced a revenue covering, on paper, three-quarters of expenditure; he clamped controls upon two dozen necessities and brought down the cost of living from seventeen to ten times pre-war; and he awarded a six times pre-war rate of wages. The plan failed.

The Greeks were not ready to accept such discipline, nor had they confidence that it would be fairly applied. Within a few weeks at the end of 1945, the cost of living had jumped to nearly 100 times pre-war. The drachma was precariously stabilized by the emergency measure of selling gold sovereigns at the Bank of Greece. The new rate of the £ was 20,000 drachmae.

Another stabilizing influence was the £10,000,000 British loan, negotiated in January 1946. The loan was interest-free; and a second notable concession was, that the Greeks could buy in Britain £500,000 worth of machinery at cost price. A British Economic Mission came out to Greece in the wake of the loan; and a Currency Committee of five, including one British and one American member, was set up as a check upon the continual increase in the note circulation. The Bank of Greece began to publish a fortnightly statement; and we learnt that the two divisions of British troops were spending in Greece about £400,000 monthly.

Hardly had the inflation crisis been staved off, when the world food crisis intervened. This took the Greeks by surprise. Throughout the winter, UNRRA had maintained a bread ration of about 75,000 tons a month (compared with normal requirements of 90,000 tons). By June 1946, the tonnage had been cut by half. The bulk of the supplies was reserved for the sixty-seven main towns of Greece; in the 'food-producing' areas, the people were left to fend for themselves. The only bright spot in the picture was that supplies of milk for the children were not reduced. UNRRA at this time claimed to be feeding practically every child in Greece: over a million of them.

However, the bread ration had made the 1946 harvest possible. When the 1945 harvest failed, the small farmers of Greece (who may own five or ten but never more than twenty acres) would never have been able to save grain for sowing, if they had not had UNRRA bread through the winter. As it was, every available fold and corner of the country had been put under wheat. In Western Macedonia, I saw wheatfields among the mountain boulders no bigger than a tennis-court. In the silk-growing districts, wheat had been sown between the mulberry trees. Throughout May and June, vortices of thick dust on the roads showed where the new American tractors were moving from farm to farm for the reaping. The final result was that as much wheat was produced in Greece as in the last year before the war. But note that this was at the expense of other grain crops.

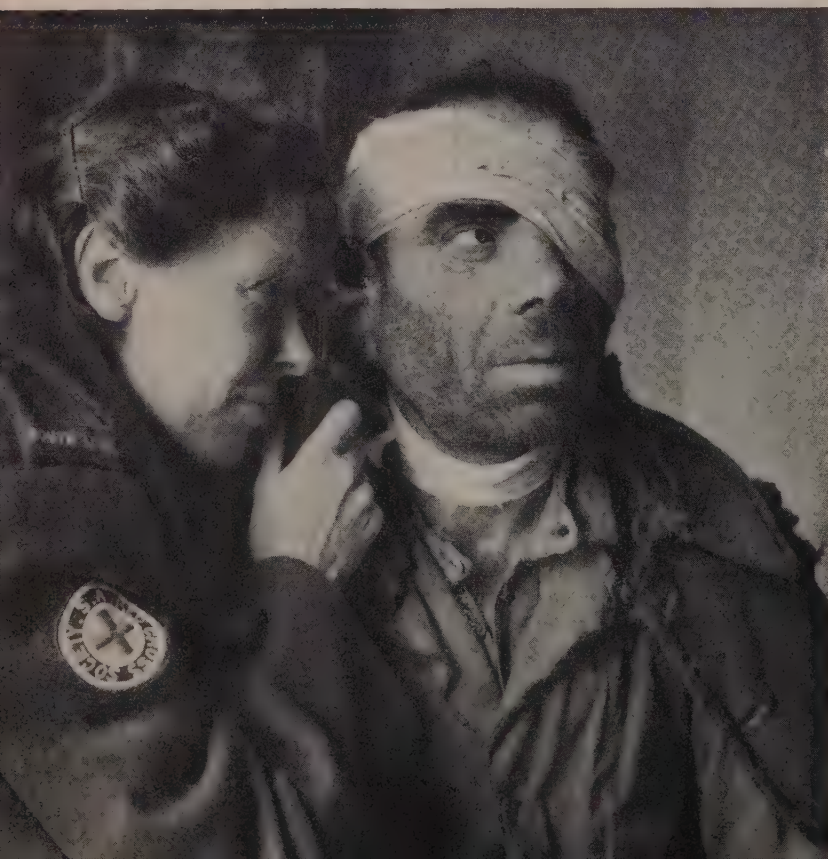
It is the central fact of Greek economy that Greece cannot grow more than about 60 per cent of the food required for her $7\frac{1}{2}$ million population. If UNRRA does not import the remaining 40 per cent, somebody must; or that percentage of the people will starve.

The world is not likely to hear much more about hunger in Greece. So long as people are assured of a dole of bread, however meagre, their privations can be generally put out of mind. But how plain it is, to anyone who knows the country, that one year or two cannot close the scars of famine. I remember meeting a university student in a friend's studio in Athens: a witty, good-looking young man who had begun to interest himself in sculpture. We arranged to have dinner together in a few days' time. When the time came, I learnt with dismay, even with incredulity, that he had suddenly begun to spit blood and had been removed to a state sanatorium. I knew of other cases, in families which were counted well-to-do, where young people whose adolescence had coincided with the famine, suddenly now developed the dreaded symptoms of tuberculosis.

By the end of the first year's working, UNRRA imports had reached the considerable figure of 2,200,000 tons. About half this

total was accounted for by shipments of wheat and cereals: equivalent to a Liberty ship once every three days. The next biggest item was coal and oil, since Greece must import all her fuel; next came the farm equipment. At the end of the list came a strange assortment of things: aircraft for spraying insecticides, netting for chicken-houses, not to speak of eleven tons of fishermen's overalls or thirty-six tons of empty honeycombs.

The Chief of the UNRRA Greece Mission once modestly described this achievement as a "transfusion" which had just pulled the patient through. Two million tons in a year sounds a lot; but it spreads very thinly over a bankrupt nation. Some of the most elementary needs seem hardly to be touched: housing, for example. After eighteen months, I revisited some of the ruined villages I mentioned at the beginning of this article. Arakhova, Lechovon, the stork-inhabited villages of Thessaly still showed their gaping walls to the sky. In Epirus, where some cottages had been put up, the villagers complained that they could have built them much better if they had been given the raw materials; in fact, in one or two cases, they had pulled the houses down and rebuilt them their own way. At Kastoria, timber for



A South African Red Cross worker examining a patient in Macedonia. The author met another South African team at Kastoria: four girls who took their travelling clinic throughout Western Macedonia, seeing 100 to 300 patients daily



'Meals in School'—or rather, meals in the village churchyard, for the school was burned down. When the days are not fine and sunny, school is held and meals served in the church. 600,000 children are receiving prepared meals in schools and it is likely that this will be one of the lasting reforms caused by the war

Young Stephanos is provided with a new outfit of clothes and a pair of shoes. His fitters are a Greek child-welfare worker and a member of the Friends' Ambulance Unit, one of the many British societies operating in Greece





(Above) New agricultural implements have been supplied to the farms. These, and the patient industry of the workers, have resulted in a harvest comparable to those of pre-war years. (Below) Georgios Papadopoulos had a small field of wheat before the war which he could cultivate because he had two mules. These were taken from him, but he is now to receive a mule from UNRRA, which will enable him to earn his living again





(Above) The Church pronounces blessing on artificial insemination. This is a new experiment, designed to bring livestock up to pre-war numbers in the shortest possible time. (Below) A Greek Ministry of Agriculture expert tests a tractor. UNRRA has imported 1500 tractors into Greece and nearly 5000 ploughs. A few tractors have been sold to individual farmers; but most are available on hire from the Greek Government





Caiques, small boats driven by sail or motor, are essential to the transport system. They carry supplies not only to the islands but to points on the mainland which are inaccessible except by sea

building had stood on the lakeside all winter while roofless villages shivered in the rain. It is true that I found one village where the people were building their own houses, and very enthusiastically (they worked on their own dwellings during the weekdays and on the church every Sunday). Also, at Koropi, I found many bright new bungalows, though Koropi is close enough to Athens to encourage the reproach that Greek governments care for the people in proportion to their nearness to the capital.

Perhaps the most encouraging signs of Greek recovery can be seen in the revival of private business. Some of the dollar remittances from America have been used to import American goods; many of the cables sent from Athens are now business orders or inquiries to firms in the United States. Shipping advertisements are beginning to appear in the newspapers. Some Greeks are pessi-

mistic about the future of Greek shipping, once so prolific a source of Greek wealth; they say that the new demands of merchant seamen will make it impossible to carry cargoes about the world on the same advantageous terms as before the war. Greek seamen certainly want better conditions of service; but it is not likely that the harbours of the Aegean and Ionian seas will suddenly stop producing men capable of taking the Greek flag into the ports of the wider oceans.

Greece must build and buy ships and sail them, if her recovery is to be complete and permanent. The war, the famine and the period of Allied relief have brought it home to all the Greeks that they cannot live from the products of their own soil, but that they must once more go out and seek their livelihood by commerce and by the exchange of goods and services with the other peoples of the world.

The Diffusion of Greek Culture

VI. Byzantium and the North

by PROFESSOR F. DVORNIK

The course of Greek influence on the minds of men has been traced east, south and west in this series of articles, up to the time when the existing nations of Europe began to take shape. We of the West do not sufficiently appreciate the strength of its impact on the Slavonic nations, nor the importance of that movement towards the north, the beginnings of which are described herein by Professor Dvornik, of the Charles IV University in Prague, who is a member of the Czech Academy

THE *Limes Romanus* marked the extreme limit which Greek culture had reached, leaving Central and Eastern Europe only superficially affected by its influence, when the Roman eagles evacuated the interior of Germany. The Romans made some progress beyond the Blue Danube towards the Bohemian Forest and their furthest outposts stopped south of Brno, the capital of Moravia; but they never reached the peaks of the Carpathian Mountains—the Tatras—and Trenchin was the highest point where a Latin inscription testifies to the presence of a Roman legion about the year 179. After the conquest of Dacia, slight progress was made towards the Dniester and the Dnieper, and the kingdom of Bosphorus, on becoming a Roman Protectorate, offered promising transit for Greek culture to Southern Russia.

Behind the *Limes* were massed teeming populations, untouched by Greek culture and unsubdued by Roman military genius: the Germanic tribes, eager to leave their original seat in Scandinavia and Denmark; the Slavs between the Oder, the Vistula and the Dnieper, and the Iranian populations in Southern Russia. Europe's fate was decided, when the Germanic tribes forced the *Limes* and the Huns led off the invasions. What was left of the Romans then faced an entirely new situation. The western part of the Roman Empire was overrun by the Germanic barbarians—the Vandals, the Visigoths, the Franks, the Ostrogoths and the Lombards, whilst the Slavs crossed the Danube, reached the Adriatic, supplanted the Sarmatians and the Germanic tribes in Southern Russia and found their way to the Crimea and the Black Sea barred by the Asiatic hordes that followed in the rear of the Huns. The Bulgarians, a people of Turkish origin, who were later to be

absorbed by the Slavs, then set up the first Slavonic empire in Dacia and Thrace.

The cataclysm did not suffice to destroy the prospects of a survival of Graeco-Roman influence and the diffusion of Greek culture in the shattered West. Byzantium had withstood the onslaught and its walls still stood guard over the treasures which Greek genius had accumulated for centuries. So much were the new masters impressed by the civilization which they found among the romanized natives and awed by the glory of imperial Rome that they were willing to honour the tradition, to adapt themselves to their new subjects' ways of living and to regard themselves as the representatives of the Emperor of Byzantium.

This fresh chance was again shattered by the menace of Islam. The eastern part of the Roman Empire shrank to the size of Greece and part of Asia Minor, and the Arab occupation of Syria, Egypt, North Africa and Spain rendered direct sea communication between the West and Byzantium almost impossible. Italy and Southern France feared for their safety. The result was that Rome, during the vital years that intervened between the 7th and the 9th centuries, when she was busy on the task of re-educating the barbarous rulers, could only hand on to them such old Greek cultural treasures as she was able to save from destruction. The Arabs, and the barbarians who occupied the ancient Roman province of Illyricum, had cut the pipe-line and severed the flow of Greek cultural tradition to the West. The two halves of the Roman Empire, which had drawn its strength from a common Greek culture, were now driven apart and the unity of European civilization was threatened.

A new contact was imperative and it was discovered when Byzantium was rallying after

its exhausting struggle with Islam. Besides exercising its civilizing influence on the Islamic world from the 9th century onward, and in spite of the revolutionary changes brought about in the following centuries in Thrace, Macedonia, Illyricum and the Danubian plains, Byzantium never ceased trading with the northern conquerors. Byzantine jewellery and articles of Greek craftsmanship have been found in the graves of Avars, settlers of the Danubian plains who were notoriously refractory to civilization; and the go-betweens were the Bulgarians, though they were none too friendly towards the Greeks. By means of this commercial intercourse, knowledge of the hidden treasures of Greek culture reached the new occupants of the Roman provinces as far north as the valley of the Morava, where, after the rout of the Avars by Charlemagne, a new Slavonic empire arose to challenge the Franks and bar their way to the Carpathians. Its princes occupied modern Slovakia and their country adjoined the Bulgarian empire on the Tisza river. Their designs angered Louis the German, king of East Francia or what is Germany today, and he concluded an alliance with the Bulgarians who were as

jealous as the Franks of the new power on the Morava and the Danube.

Rastislav of Moravia's counter-move has puzzled historians. In 862, an embassy from Moravia arrived in Constantinople requesting the Emperor Michael III to send to the Moravians missionaries able to preach in Slavonic. So far the Legends; but no pious words could conceal the fact that the Moravians were out for a political and a cultural alliance. The consequences were immediate, as the Bulgarians discovered to their cost. As they prepared to attack the Moravians in concert with the Franks, a Byzantine army fell on them in the rear and forced them to throw up their Frankish alliance. Their *khakan* Boris was baptized by the Byzantine Patriarch Photius and Bulgaria, with the whole of the Balkans, lay open to the penetration of Greek culture in its Byzantine form.

Another embassy, this time led by two Greek scholars, the brothers Saints Cyril and Methodius, brought the Christian message to the Slavs of the Middle Danube and of the Morava. Their first great innovation was their refusal to impose on their new converts the Greek language as the only medium for

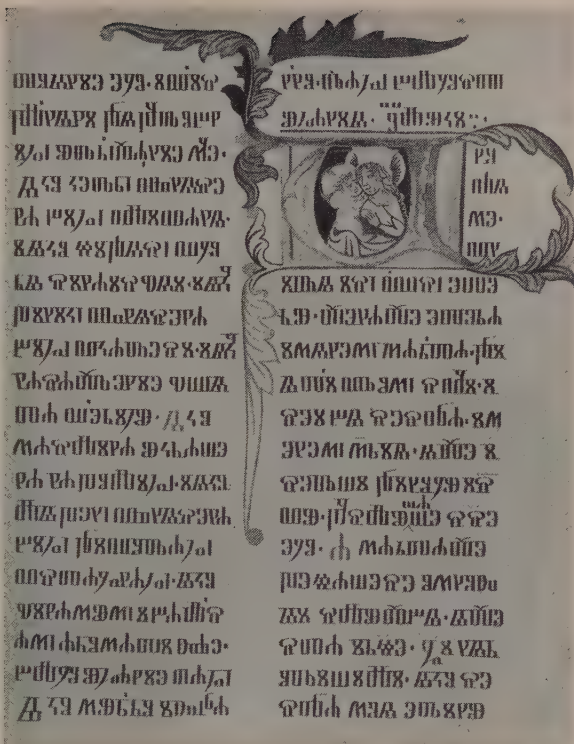


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getting acquainted with Greek and Christian literature. For this purpose, Cyril devised the Glagolitic alphabet, based on Greek minuscules and kindred alphabets, and proceeded to translate Holy Scripture into the Slavonic dialect of Macedonia with which he and his brother were familiar and which at that time offered little difficulty to the other Slavs. They were inspired by their own Greek genius, democratic and fond of freedom, which respected the individuality of men and nations, so alien to the Romans who knew of only one medium of contact—their Latin language and Roman ways of life.

The innovation served to enrich western Christianity with the best of Graeco-Byzantine tradition, as Slavonic translations from the Greek multiplied, brought the Slav converts into contact with Holy Scripture, the Greek liturgical books and canon law and trained them for more original work in Slavonic after the Greek and Byzantine literary style. The life of St Cyril, written in Moravia at the end of the 9th century, was the first achievement in this respect, a work of great historical value which matched the best Byzantine products of the period. In this way, with Bulgaria lying wide open to the influx of Graeco-Byzantine culture and Serbia attracting Greek missionaries in the reign of Basil, a new channel was being dug in Southern and Central Europe for the free penetration of Greek learning into Western Europe. What made for peaceful contacts between the Latin and Greek worlds was the broad-mindedness of the Greek missionaries who in Moravia did not object to Slavonic translations of the Roman rite. Moreover, the Papacy, alarmed by the growing power of the Frankish hierarchy, gave every encouragement to the Byzantine missionaries in Moravia. As the country's political authority extended over Bohemia, Galicia including Cracow, and parts of Pannonia, it offered a wide field for Greek cultural expansion. Slavonic letters and liturgy penetrated even among the Croats of Dalmatia.

But the prospects never materialized. The Franks and the Germans, jealous of the new power that had arisen in Central Europe and threatened their eastward expansion, made use of the Magyars, the new invaders, to



From "Evangelia Slavice"

Old Slavonic Gospel, written in the 14th century in Glagolitic letters in the Abbey of Emaus (Prague). Brought to Byzantium and then to Rheims, it became the famous *Texte du Sacre*, used during the coronation of French kings

destroy the Moravian Empire and to cut off the north from any Greek influence. The little that was left of Cyril's and Methodius' work was saved by the Bulgarians. Their khakan Boris-Michael offered sanctuary to Methodius' leading disciples and with their assistance laid the foundations of the Bulgarian National Church. The bulk of the Slavonic clergy fled from Moravia to Bohemia; and such was the vitality of the new learning imported by Cyril and Methodius that, though severed from its source—Byzantium—and subject to ceaseless attacks by the Frankish Latin clergy, it flourished in Bohemia throughout the 10th century. The court of Prague became the centre of a very advanced civilization. It is stated that St Wenceslas, duke of Bohemia, read Latin, Slavonic and Greek, and his martyrdom in 929 was recorded by an anonymous disciple of the Greek apostles in a biography which is considered the oldest masterpiece of Czech literature. Transla-



From "Early Bulgarian Art" (Paul Haupt)

(Above) The Church of St Clement at Ochrida, built in 1295 and dedicated to the disciple of Saints Cyril and Methodius, who introduced the Slavonic liturgy into the Bulgarian Church. It is distinguished by the decorative manner of employing the building materials. (Below) The Church of the Annunciation at Grachanitsa, built by Tsar Milutin of Serbia before 1321. This church, with its five cupolas, is a fine specimen of the Serbian and Byzantine architectural school of the 14th century



From "L'Art Byzantin chez les Slaves" (Paul Geuthner)

tions from Latin and Greek and original works in Slavonic proceeded apace and found their way to Russia where they stimulated the growth of Graeco-Byzantine civilization. Not until the 12th century was the Slavonic liturgy finally ousted by its Latin competitor, but its tradition remained alive in Czech history. In the 14th century, Charles IV reinstated the Slavonic rite in the Benedictine Abbey of Emaus.

The civilizing effects of Graeco-Byzantine culture could best be seen among the barbarous Bulgarians who in two or three generations took rank among the civilized nations. Boris's successor, Simeon, received his training in Constantinople and made up his mind to make of his country the political and cultural rival of Byzantium. Under his inspiration, a host of monks acquainted with Byzantine letters proceeded to translate into Slavonic the best of the Greek theological books; and to facilitate the work, the Glagolitic alphabet so designed by St Cyril was replaced by the Cyrillic alphabet which is still used by the Orthodox Slavs and approximates more closely to the Greek script. Not only theological treatises were translated but also profane works such as George the Monk's Chronicle, on which the Slav nations were to draw for centuries for their information on world history. Greek artists taught the Bulgarians the secrets of Byzantine arts and crafts, so that Simeon's court soon rivalled the Byzantine court in splendour and his reign was singled out as the golden age of Slavonic culture. The whole mentality of the people was remodelled on the Byzantine pattern and the Bulgarians felt themselves in a position to adopt Byzantine political thought based on Hellenistic ideas of kingship. In this light, Simeon's attack on Byzantium was never aimed at the destruction of the Byzantine Empire: all he wanted was to become the Emperor of the Romans and to incorporate the Slavonic world into the Empire.

He failed; but Bulgaria kept its Byzantine culture. And when the Byzantines succeeded in the 10th century in annexing the country as a Byzantine province, they had the good sense to respect the Slavonic liturgy and the autonomy of the Bulgarian Church. When Bulgaria recovered its independence in the 13th century, Byzantine art and culture were at their best, as the beautiful frescoes of the churches in Boyana, near Sofia, and in Tirnovo are still there to show. Recent excavations in Sofia have also thrown new light on the evolution of Byzantine art in Bulgaria.

Thence, the Slavonic liturgy and literature spread to Serbia. The Serbs were so fascinated by Graeco-Byzantine culture and

spirituality in their Slavonic garb that their prince Stephen Nemanya left his throne to join his son St Sava on Mount Athos, where he founded the famous Khilandar monastery which played such a notable part in the Graeco-Byzantine regeneration of the Slavonic peoples. St Sava issued a Slavonic collection of Greek canon law which to this day has governed Slavonic Orthodox Christianity, and the Lives of Nemanya and St Sava written in Slavonic on the Byzantine pattern marked the birth of Serbian national literature. The famous Serbian monastic churches—Grachanitsa, Sopočani, Nagoricha, Markova Crkva (Marko's Church)—all built by Serbian princes in the 13th and 14th centuries, still bear witness to Serbian proficiency at the Byzantine school. Modern students of art still admire the Serbian frescoes and their wonderful combination of Byzantine and Italian technique. The Tsar Dushan's Book of Laws (1349), based on Greek and Byzantine jurisprudence, also shows that the Serbs were keeping abreast of the western nations in legal matters.

But Byzantium's greatest cultural conquests were made in Russia, where Greek influence had spread from the Crimea over the southern territories long before the Slavs ever reached those lands. It is well known that the Sarmatian tribes excelled in the art of enamelling by combining their own with the Byzantine technique. They then passed it on to the Goths who introduced it to the West. The riches of Byzantium could not fail to rouse the predatory instincts of the Swedish Rhos, first settled among the Slavs in Novgorod and later in Kiev; but their disastrous attack on the Greek city in 860 taught them a more peaceful method for sharing in its wealth. A lively trade followed between Kiev and Byzantium with a simultaneous infiltration of Greek Christianity among the Slavs and their Scandinavian masters. Already in 911 and 945 Oleg and Igor of Kiev concluded commercial treaties with Byzantium and Russian traders occupied their own quarters in that city. About 955 Igor's widow Olga received baptism there; and in 988 Vladimir adopted the faith and married a Byzantine princess.

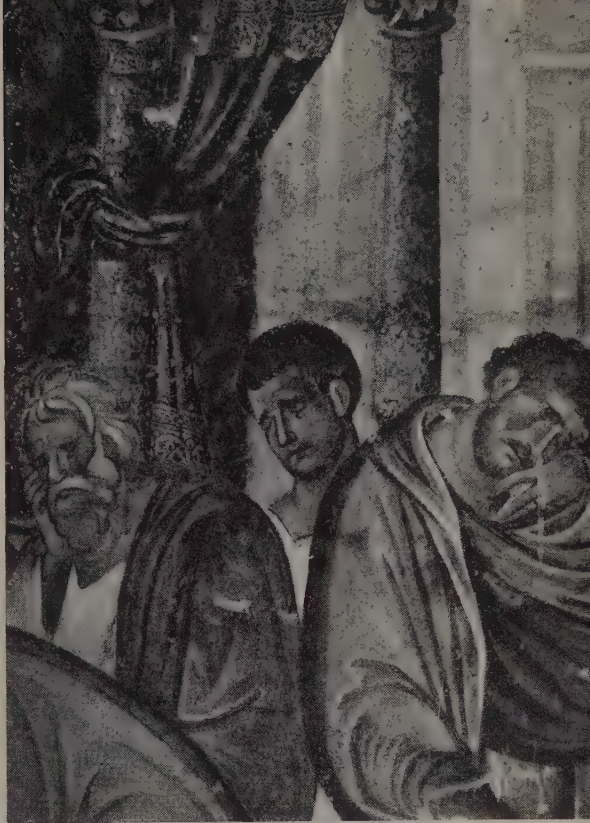
Russian Christianity was cast on the Graeco-Byzantine model and the Slavonic liturgy and literature handed on by Bulgaria helped the process. Bohemia also provided Slavonic books and translations from the Latin. Cultural progress was even more rapid in Russia than in Bulgaria, and more original. The discourse on the Old and New Testaments by Hilarion of Kiev (1050) recalls the style of the Greek Fathers and constitutes a feat of assimilation and creativeness.



(Opposite) Portrait of John Oliver, a high dignitary under the Serbian Tsar Dushan, holding a model of the Church of Lesnovo, founded by him in 1341. The inscription on this fresco is in Old Slavonic and in Cyrillic letters. The ceremonial dress reveals Byzantine influence

(Right) The Apostles mourning the death of Our Lady. A detail from a fresco in the Church of Sopochani, Old Serbia (13th century). The realistic style of the painting is most impressive. The Sopochani frescoes display a strong Italian influence on Byzantine and Serbian technique

(Below) The Death of the Virgin. A 14th-century wall-painting in the Church of St Peter and St Paul at Tirnovo in Bulgaria. Christ is holding His Mother's soul and closing her eyes. Here again, the figures are agitated with passionate realism



From "Monumenta Artis Serbicae" (Slovansky Ustav)
From "Early Bulgarian Art" (Paul Haupt)





From "L'Art Byzantin chez les Slaves" (Paul Geuthner)



From "Geschichte der Russischen Malerei" (Martinus Nijhoff)

(Above, left) *Our Lady of Vladimir*, the most highly revered icon throughout Russian history. The earliest remaining portion of the painting is from the late 11th century. The icon was brought from Byzantium to Kiev, thence in 1161 to Vladimir and later to Moscow. (Right) *St John Chrysostom*: one of the beautiful mosaics decorating the Church of St Sophia in Kiev. They were executed in the 11th century by a Byzantine artist and show traces of Hellenistic influence. (Opposite) Russian icon of Saints Boris and Gleb, by an artist of the School of Novgorod, end of the 14th century

At the beginning of the 12th century, the Russians had their first national chronicle whose fluent narrative, raciness and freshness are a delight to the reader. It is written in the Byzantine tradition and the author's erudition is genuine. At the same period, the Duke Vladimir Monomakh wrote for the benefit of his children a book of instructions with a terseness which few western princes would have been able to imitate. Equally striking is the account which Abbot Daniel wrote of his pilgrimage to the Holy Land, a record at once charming and informative. Clement Smolitch's references to Homer, Aristotle and Plato afford evidence of early

familiarity with the Greek classics, while Cyril, bishop of Turov (1185), is deservedly compared to St John Chrysostom. Original Lives of Russian saints were written on the Byzantine model and the *Pechersky Paterik*, a collection of translated and original biographies, has lost none of its edifying charm.

The Russians were as keen as the Bulgarians and the Serbs on Byzantine political thought. They acknowledged the Basileus of the Romans as the representative of God on earth and the head of Christendom, submitted to his laws and referred to him all important decisions in religious matters. The metropolitans of Kiev who ruled the Russian





Society for Cultural Relations with the U.S.S.R.

The Church of St Sophia at Novgorod, built by Vladimir, son of Prince Yaroslav the Wise, in 1045-52 on the model of St Sophia in Kiev, the work of Byzantine architects. It was destroyed in the late war by the German vandals

Church were for many years Greek prelates appointed by the Basileus.

Byzantium's legacy to Russia was as generous in arts as in letters. The Church of Holy Wisdom (St Sophia) erected by Yaroslav the Wise in Kiev (1017-37) is a jewel of Byzantine art, built and decorated by Greek artists. Few samples of Greek architecture of this period are left even on Greek soil to equal it. The church of Holy Wisdom of Novgorod (1045-52) as well as the Nereditsa church (1198) were copies of St Sophia of Kiev, whose bold lines converging on a crown of thirteen cupolas must have appealed to Russian taste, for they became the classic feature of Russian religious architecture.

Second to Kiev, Novgorod-Pskov developed into another such centre, to be followed by Vladimir-Suzdal.

The mosaics and frescoes of St Sophia in Kiev were uncovered in 1843. They are of singular beauty, some of them exceptionally striking for their vigour and realism, and they represent an indispensable link in the evolution of Graeco-Byzantine art between the 10th and the 12th centuries. The same applies to the frescoes of Novgorod (12th century), and Vladimir, and to the icons of Byzantine origin. The touching beauty of Our Lady of Vladimir (11th century) has inspired millions of Russians.

It seemed then that in the 11th and 12th centuries a new channel had been discovered through which Greek culture could have flowed into the west of Europe. And Russia of Kiev seemed ready and willing to act as intermediary between Byzantium and the West, for her doors were wide open and she was well known in Germany, France and England. Her princes were matrimonially related to every European court that counted, and Byzantine influence was actually penetrating from Russia into Poland; so much so that the Polish king, Mieszko II, was praised by Matilda of Swabia for reading his prayers in Latin, Slavonic and Greek. With remnants of the Slavonic liturgy still left in Bohemia and Southern Poland, and with Boleslas the Great of Poland's determination to build a Slavonic empire and to unite Poland with Bohemia, there seemed then to be an excellent chance for the two Latin and Greek cultures to meet in Central Europe and to blend harmoniously

to the benefit of the human race. But these possibilities never came to fruition. Boleslas' empire was torn to pieces by the German kings, and the Mongolian invasion lowered the first 'iron curtain' over Russia of Kiev, already weakened by its division into rival principalities. Europe was to wait centuries for its Renaissance, and Russia, isolated and enslaved, vanished from the stage of European politics. When she emerged again into the light of freedom, she looked strange and incomprehensible, yet was found to have remained faithful to her Byzantine inheritance to such an extent that it has been impossible to this day to understand her without reference to her Byzantine origin.

Fusion in New Mexico

by HERBERT O. BRAYER

SURPRISE and incredulity—as well as outright consternation—must have been manifest in the Japanese army forward command post on Okinawa when, at the height of that historic Pacific battle, the tapped American communications circuit began to emit a totally unintelligible jargon. Under a fire-swept ledge a few yards away an American officer winked shrewdly at the lean dark-skinned sergeant in camouflaged coveralls who was reporting attack and fire control orders into a field telephone—in *Navajo*. The operator was part of an American communications team composed entirely of highly intelligent, well-trained soldiers from the some two hundred different Indian tribes still flourishing in the United States. On the other end of the circuit a second American, who only a few months before had left his mud and log *hogan* on the reservation near Shiprock in north-western New Mexico, quickly translated the message and reported additional information over the instrument—in *Navajo*.

Six thousand miles to the east of Okinawa a trainload of heavy tanks and jeeps wound slowly through the Raton Pass in southern Colorado bound from the armoured corps training centre in the sun-baked desert of eastern California to a port of embarkation—and a future crossing of the Rhine. Along the roadbed a denim-clad track gang watched the heavily loaded freight train disappear into the black void of a long tunnel.

The track crew was made up entirely of Indians, Pueblo Indians from the ancient mud-terraced villages along the upper Rio Grande in New Mexico. It was thus throughout the struggle from 1941-5; Navajo and Pueblo united in purpose and action with Spanish-American and Anglo-Saxon neighbours from the sun-baked state.

In the mid-16th century, the Spanish *Conquistadores* found the sedentary Pueblo Indians living in their multiple-storied mud (*adobe*) and stone apartment-like villages (*pueblos*) along the upper Rio Grande and other streams in New Mexico from which they drew water for the elementary irrigation systems which nourished their small, intensely farmed fields. While some of the pueblos were small, others had populations running into thousands, with community dwellings containing as many as twelve hundred rooms. There were many pueblos then, and the culture of the peaceful and industrious Indians was the highest to be found among the indigenous peoples north of the Aztec Confederation in New Spain. Their political-religious and social systems, as well as skill in agriculture and architecture, were so advanced that they were called savages only because they had not developed a written language.

Despite heavy exactions and encroachments upon lands and villages, the Pueblo peoples managed to survive the shock of the European



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conquest and the ensuing centuries of physical and cultural contact with Spanish, Mexican, Anglo-American and less advanced Indian cultures. Today more than eight thousand of their descendants live in eighteen pueblos in New Mexico. The Indians own their lands and have a political status independent of the state and local governmental units in which the pueblos are located.

While maintaining their traditional social and political institutions, they have in part adapted their economic pattern to that of their European-descended neighbours, marketing surplus crops and purchasing clothing and processed foods from department stores and from the national mail-order companies. As wards of the federal government the Pueblos participate in the various programmes of the Office of Indian Affairs of the Department of the Interior. Highly integrated educational plans for adults as well as children operate in each pueblo. Agricultural, domestic science and health projects, sponsored by the government and supported by the various Pueblo councils, have materially improved the standard of living of these Americans over the sadly reduced levels to which they had been forced during the last century through ruthless encroachments by land-hungry speculators and settlers, and the vagaries of nature in a land where rain means life or death.

When the Spanish under Don Francisco Vasquez de Coronado invaded New Mexico in 1540 they found the Pueblo Indians already engaged in deadly conflict with a powerful tribe from the north-west, the Navajos—a nomadic people of Athabascan stock—who periodically swooped down upon the pueblos, seizing food, clothing, women and children. Vainly the Spaniards sent out expeditions to stop the Navajos, only to find their own *ranchos* raided, their livestock driven off, and the marauders vanished into the ranges and canyons to the north-west.

In periods of truce the Navajos (and the Pueblos) acquired a new economy from the Spanish settlers. The introduction of livestock revolutionized life in the American South-west. The Indians quickly discovered that the Merino sheep driven over the long trail from Mexico to the upper Rio Grande settlements could help alleviate the precarious existence attendant upon rains which all too frequently failed to come. The small Spanish beasts provided meat, wool, fats and hides. They soon became one of the principal bases of wealth among the Indians. Navajo herders—familiar with every configuration of the vast *mesa* land—were much in demand. They became excellent shepherds, developed large

flocks of their own, and from the mission *padres*, as well as service on the ranches, learned the arts of spinning, dyeing and weaving.

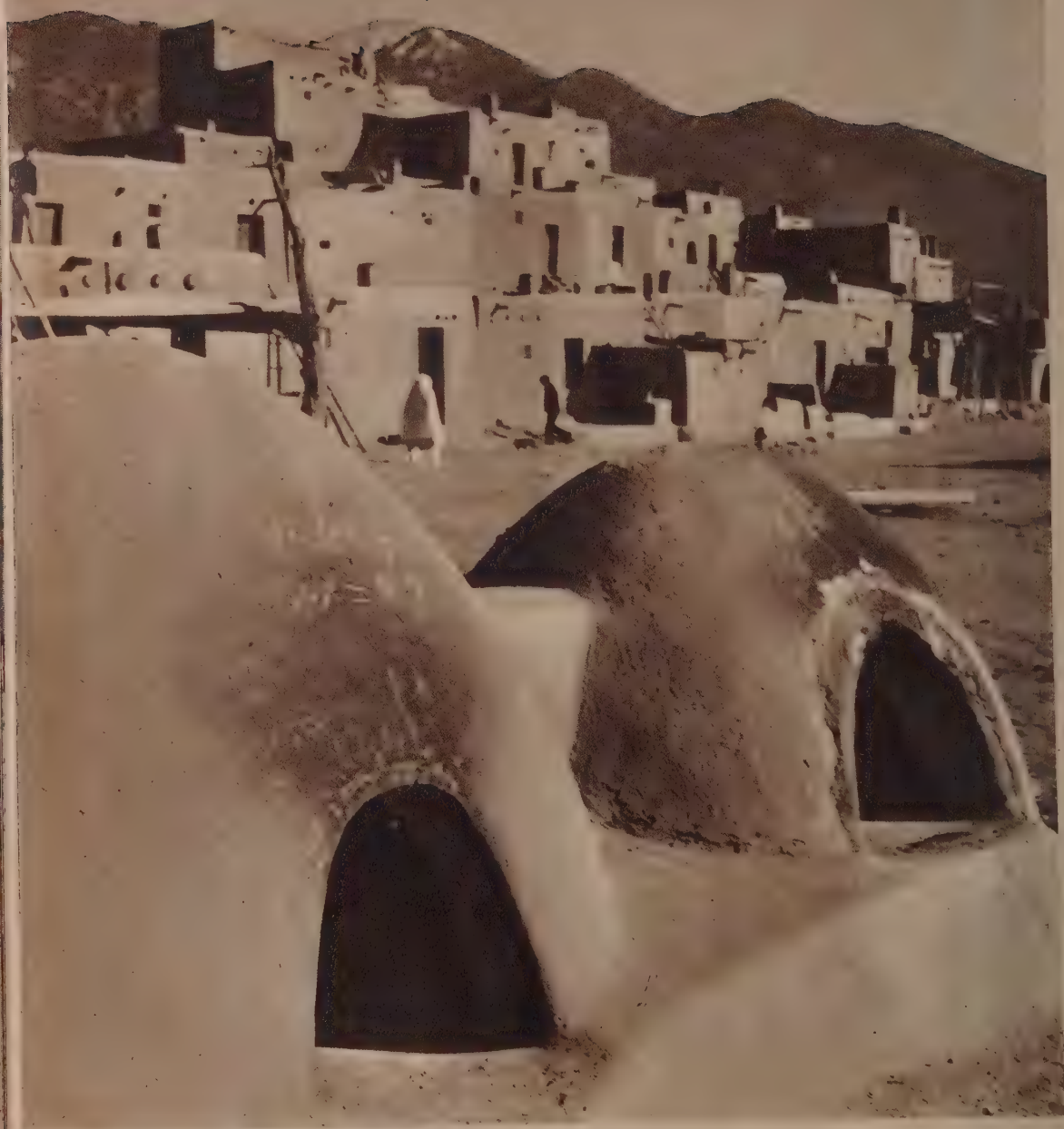
With the settlement of the territory, after its seizure by the United States in 1846, strong demands for the end of Navajo depredations were made by the New Mexicans. The end came in 1863 when Colonel "Kit" Carson and a mixed force of cavalry, infantry and Indian allies invaded the secret Navajo stronghold at Cañon de Chelly in north-eastern Arizona and made prisoners of nine thousand (out of a probable fourteen thousand) tribesmen, their wives and children. The three-hundred-mile march of the captive Navajos from the canyon to their concentration camp at Fort Sumner, New Mexico, is still remembered in tribal legend as "The Long Walk". Their imprisonment had a pronounced effect upon the future of the tribe. They quickly discovered that the large number of military personnel guarding the camp, and their families, furnished a lucrative market for the blankets and rugs made by the Navajo women on their crudely constructed looms, and for the hand-made jewellery—an art learned from the native Mexican settlers—manufactured from Mexican silver dollars. Despite government care the confinement was disastrous to the Navajos—many died of disease and malnutrition.

Many of the women became domestics in the homes of the officers and learned for the first time the manners and customs of their conquerors. The wardrobes of their mistresses proved the greatest attraction. When the Army Quartermaster issued the Indian women their ration of cloth they promptly fashioned them into garments resembling those of the ladies at or near the fort. Full flounced garments made of sateen or calico—with as many as six or ten multi-coloured petticoats—topped by full-cut calico blouses for everyday wear and a velveteen blouse decorated with silver buttons and turquoise necklaces for dress or ceremonial occasions, became the established costume of the Navajo women. Black, high, narrow and pointed buttoned boots—one of the first products of the newly established mass production boot factories of New England—were also issued, and further heightened the effect of the Indian women copying from the post ladies. This, then, was the origin of the costume worn by the Navajo women today.

In the spring of 1868 a delegation of Navajo women obtained a conference with General William Tecumseh ("War is Hell") Sherman and pleaded for the liberation of their people. They promised to keep their



Dressed for a ceremonial occasion: girls from Acomá, the only remaining fortress-pueblo, built on the top of a mesa (table-land). The fusion of modern American with native culture is shown by their fashionable coiffure and by the bone suspensions and beadwork on their doeskin jackets—modern, though following ancient patterns



Taos, the most spectacular pueblo in the United States, with the largest communal dwellings in the New World : 800 rooms in five storeys. The structure is of sun-dried adobe mud bricks; its upper floors are accessible by ladder only. In front is a type of oven introduced by the Spanish conquerors



A modern Navajo version of the 'covered waggon'. On the seat of the springless 'buckboard' is one of the famous Navajo blankets, as traditional as its owner's sateen skirt and velveteen blouse, originally copied from the costume worn by the wives of American military personnel in the 1860's



Navajo lad and Navajo lass. Though a true representative of his tribe, nothing he wears is of Indian make. From the white man's stores come his blue denim trousers and his 'five-gallon stetson' hat, his lariat of fine Philippine hemp and his horse's saddle and bridle



Her blanket also comes from a factory: the Indians cannot usually afford to keep the ones they make themselves, which are reserved for sale. But everything else about her is Navajo-made — her costume, its beaded collar, her jewellery, and also the hand-made waggon wheel



A contrast in types. Here is the pueblo-dwelling Taos, with his high cheekbones, heavy brow-ridges and flared nostrils; in his braided hair the 'breath-of-life' feathers —



—and here the nomad Navajo, with her broad face and 'delicate' nose, 'Asiatic' in appearance. Note her 1860 parasol, her shell-shaped concho buttons and her 'store' blanket



All photographs by André de Dienes

At Gallup, New Mexico, the Indians assembled for the annual inter-tribal meeting compete in the display of native handiwork and re-enact ceremonial dances for the benefit of other tribesfolk and visitors. Left, a Taos—his drum is native-made; centre, a Plains Indian; right, an Apache—he beats a music-store drum

men on the paths of peace, and to obey the white man's laws. They proudly pointed to their own dress to illustrate how much they had learned, and to emphasize their desire for the 'new way of life'. Sherman met the tribal chiefs and a treaty between the Navajo Nation and the United States of America was formally solemnized. The Indians agreed to return to their reservation, to keep the peace and refrain from attacks upon their 'red' neighbours as well as their 'white' ones. The United States pledged an adequate reservation, subsistence supplies, schools, and a teacher for every thirty children. As the 7000 remaining Navajos poured out of the encampment they were greeted by a strange sight. Closely tied to a huge cottonwood tree was a large goat. While it repeatedly butted itself against the massive trunk, the tribe filed by fully cognizant of the pointed object lesson of the futility of resisting the United States Government.

The Navajos kept their promise; the government did not. The reservation proved inadequate; the rations scarce, poor, and frequently misappropriated by agents or contractors; only a small proportion of the schools was established, and a smaller number of the teachers provided.

In the seventy years since their release from Fort Sumner, the Navajos have multiplied four-fold. They comprise today the largest single Indian tribe in America, numbering 52,000. The demand for additional food to support this increase has led to an unprecedented expansion of the sheep herds, and uneconomic utilization of the grasslands of the reservation. Today vast areas of the reservation contain little or no forage or grasses. Curtailment of the number of sheep ranged has brought hardship upon some Navajos, but breeding programmes designed to increase the quality of both wool and meat have been instituted by the Indian Service in cooperation with the tribal leaders.

Experimentation in the growing of crops along the stream-beds has proved more successful during recent years than earlier attempts. Corn, squash, beans, melons and some wheat are now being produced in sufficient quantity to make an important addition to the Navajo diet. One of the principal sources of income for the Navajo tribe is still the sale of woven blankets and wool. In the years preceding the war about one-quarter of the total production of wool on the reservation, estimated at 650,000 lbs., was woven into brightly-coloured blankets and rugs. Their sale netted the Indians about \$387,500—nearly a fourth of the total income received from the raising of livestock. This

sum had greater significance than the figures would indicate, as it provided the means of sustenance for a large number of Navajos without any other source of income. Weaving is largely the task of the women, the men devoting themselves to the manufacture of exquisite silver and turquoise jewellery. Navajo *concho* belts, bracelets, rings and necklaces find a ready market throughout America.

Today both Navajo and Pueblo, living side by side, carry on their ancient tribal ceremonials, plant their crops and raise their livestock, manufacture blankets and jewellery or pottery, sell their wool and surplus crops to the white man's agents or at the trading-posts, and welcome home the many thousands of their sons and daughters returning from the armed forces. Both peoples have adjusted themselves economically to their peculiar environment. Annually thousands of their Spanish- and Anglo-American neighbours visit the Navajo reservation and the Pueblo villages, and learn at first hand of the culture of the American Indian. Simultaneously, Navajos in their colourful sateen and calico dresses, their men in the blue denims and black 'five-gallon stetsons', mix with the blanketed and plaited-haired Taos Indians or other Pueblo peoples in the white man's stores in Albuquerque, Santa Fé, Taos and Gallup.

The Indian has learned the importance of his position as an individual and as a member of a tribal group. He has adapted himself to the white man's economic life, but he still seeks recognition and equality in education and social status. The schools for the sedentary Pueblos are much better than those for the nomadic Navajos. The government now seeks to improve both. Social position will come with the improvement in education and economic standards.

The awakening consciousness of the Indian received an additional impetus from the experiences of the war. For the first time in his life the young Indian man, or woman, in the services received the same food and housing as his more fortunate fellow-American. He returned to the hogans on the reservation, or the ancient pueblo, with a new resolve: to obtain complete recognition as a full-fledged citizen of the United States. Thousands of Navajos and Pueblos who aided in the construction of huge military depôts, worked on the railroads, or in the factories, discovered that they were able to hold their own in a modern economy, and having once tasted financial independence in skilled and semi-skilled industry, will no longer be content with a shepherd's pittance.

Pottos and Pangolins

Some small animals of the Gold Coast Forest

by G. S. CANSDALE

AN article by Dr Julian Huxley in this Magazine, June 1945, gave some idea of the very varied nature of West Africa—in country, climate, vegetation, peoples and development. The Gold Coast does not include some of the extremes found in other parts of West Africa, but it is, nevertheless, a country with a great variety of vegetation. It is quite true that a considerable area of the Gold Coast was once covered with dense high forest, much of which



A full-grown lesser bush baby, only about 5 inches long, with a 7-inch tail. Hardly ever seen by day, it is best known by its peculiar night-call

remains today, but the greater part is now, and has for a long time been, much less thickly wooded, having various types of thicket or savannah forest, the structure of which is largely determined by the amount and distribution of the rainfall. The coastal plains of the south-east have an erratic rainfall of 30-40 inches, which can maintain a thicket type of cover on the better-drained soils. North of the main forest block there is a great expanse of savannah woodland of very varying density. Under certain conditions the tree cover is almost closed and the forest may look rather like some stages of chestnut coppice woodland in the south of England; on the river flats there may be areas of almost pure grass, but very few large areas are quite as open as the south-eastern coastal plains.

The main high forest zone, enjoying a rainfall of 50-85 inches, contains a variety of types which need not be enumerated here; but its important features, for the zoologist, are its very mixed nature and the presence of several layers of trees and shrubs.

It is unusual to have more than one mature tree of any of the large kinds per acre; a more probable figure, even for the commonest kinds, is one per 10 or 20 acres. Tropical high forest thus differs very radically from forests in the northern temperate zone, which are unlikely to have more than three or four main constituents and are often nearly pure stands of one tree.

Within this block of high forest, and also in the forest outliers in the north-east, the vegetation over large areas has been drastically altered by man. Extensive town clearings have been made, with grass-covered open spaces maintained only by constant and heavy clearing; much larger areas have been used for farming and are now occupied by permanent crops such as cocoa, or cleared and re-cleared for a three-year food crop every 3 to 5 years, becoming covered with secondary forest or re-growth in the intervening fallow. This is often known as 'shifting cultivation', but it is, in fact, a long fallow system and the person who first clears an area of forest establishes very definite rights over it for his family. These food farms, or "forest gardens" as they are called in some parts of the tropics, would



All photographs by the Author

Many varieties of evergreen and deciduous trees are found in the tropical high forest zone—40 or 50 different kinds may be found on an acre—some of which rise to a maximum height of 200 ft. Most of the large trees are irregularly deciduous in or near the dry season, but the leaf-fall is spread over a fairly long period and, with a speedy new flush, the area is seldom bare of leafy cover

hardly be recognized as such by the newcomer, for they contain varying numbers of standing trees, especially those of the upper canopy, and 'clean' farming and pure crops are almost unknown. These farmland and town areas, with the secondary forest, are often rich in oil palms and they constitute a series of habitats very different from the surrounding bush; they are the home of a surprisingly large number of the smaller mammals now seldom or never seen in the virgin forest.

The following short notes describe very briefly the animals illustrated here and also a few other important and interesting ones. Some of the pictures, such as those of the squirrels and bush babies, are of tame or semi-tame animals living free around the compound or in large enclosures; for various reasons it is virtually impossible at present to take any kind of picture of them in the wild. Others such as the potto, pangolin and tree bear, are rather slow-moving creatures by day, with comparatively little fear of man, and once found in the bush they can often be photographed without undue difficulty.

The pangolins, or scaly anteaters, are quite the most extraordinary mammals found in West Africa, looking only like descendants of the giant armoured lizards of prehistoric times. They belong to the order Edentata, the toothless ones, and are some of the most specialized animals now living, for their food consists entirely of several groups of ants and



Stanford, London



These quaint, inoffensive tree bears are entirely vegetarian, and have few enemies. Only one young is generally born at a time, though there are sometimes twins; they seem to follow their mother about for a long time

(Below) The black-bellied tree pangolin, or scaly anteater. While pangolins are among the very few creatures immune to attack by driver ants, they suffer severely from ticks which lodge under the over-lapping scales





This wide-eyed potto, or short-tailed lemur, clinging to the thinnest of branches, is a cautious, ponderous animal that rarely ventures out by day. At night, however, it ranges widely on the ground

The alert cat-like palm civet is far from being wholly carnivorous as are most of the civet family, having a great fondness for cultivated crops of bananas and plantains when it can get them



A young three-crested pangolin busy extracting black ants from their nest with its long, thin, sticky tongue, having first broken the nest open with the very strong bent claws on its forefeet



termites, including the notorious driver, or legionary, ants. Their specialized feeding explains their rarity in Zoos; once in a long while a captured pangolin will deign to change over to a diet of condensed milk and ground meat, licked up with the tongue, but it never survives very long. Three kinds are found in the Gold Coast; the very large ground pangolin, now very seldom seen, and the three-cusped and black-bellied tree pangolins which are illustrated here. Unfortunately all of them are in great demand for food and they seem especially defenceless against man, even though they are immensely strong and resistant to injury, the tree varieties being able to roll into a ball and drop from a considerable height. Their only defence is to roll into a very tight ball, with head in the middle and forefeet clasped tight over the eyes.

The lemurs which are found in such variety and numbers in Madagascar are rather poorly represented in West Africa and the Gold Coast has but three species. The potto, or short-tailed lemur, is a strange, ponderous creature, so slow in its general movements by day that it is locally called the sloth. At night it wakes up a little, but except when running along a branch it is always very careful to get a firm new grip before leaving the last one, and I have never seen it jump. Its home is in the thick forest, where it passes the day in a hollow tree or else fast asleep on a branch, sitting on its haunches with its head tucked in between its thighs; it can also sleep hanging from all four feet in a bunched-up position. At night it ranges widely and must spend much time on the ground, for it is often taken in deadfall and other farm traps. It seems to be largely a fruit-eater but it also

takes a wide variety of animal food, including lizards, giant millipedes, young birds and eggs, and almost all kinds of insects.

The other two lemurs are very different creatures and they are, I think, West Africa's two most delightful animals. The larger bush baby, or galago, is quite well known, for it is found in various forms from the Cape in the south to Kenya and Uganda in the east and Senegal in the west. There are generally some in the London Zoo, but these little animals are so nocturnal that they do not show up to advantage there.

The lesser bush baby lives in the high forest and old farmlands, where its night-call is a familiar sound, a shrill chatter with a definite rising and falling tone pattern, but as this very tiny animal is quite nocturnal, very few people know it by sight. The commonest colour form is a mousy grey-brown, but a pale variety, almost straw colour, is also known, as well as intermediate forms. Both this and the larger species eat many kinds of fruit but their favourite food appears to be insects, with which they deal most effectively. My wife and I kept a family of these delightful little lemurs in our compound in Accra, on the coast, and reared what were probably the first to be bred in captivity. They used to kill the huge crickets, some 2 inches long and very powerful, with two or three bites almost too quick to see, and then eat them joint by joint.

The West African tree bear is another nocturnal animal of the tropical forest. It is actually a Hyrax, belonging to an odd family generally classified near the elephants, and in most parts of Africa it is known as the tree Hyrax or tree dassie. Like the tiny bush baby, the tree bear is known to most people by its voice, the

(Opposite) Baby green squirrels (on the arm of the author's wife), now full-grown and in the London Zoo. (Right) The red-headed forest squirrel. The head, legs and underparts are brick red and the back is greyish; but its real glory is in its huge bushy tail, black and white speckled, with a red flare down the centre



(Centre) A giant forest squirrel, seldom seen at close quarters. This one is looking speculatively at a juicy palm fruit. (Left) Various types of ground squirrels are found in Africa. The one seen here is a sandy-brown creature, about the size of a grey squirrel, with white stripes on its sides and a very bushy tail

most penetrating and distinctive night noise in West Africa; it is a raucous 'waaaa', with rising and falling tone, repeated on an average of over forty times and going on for perhaps two minutes, gradually rising in volume and pitch. As I write these notes at a small forest station in the Gold Coast I can hear three or four calling in the surrounding bush.

In West Africa the small carnivora are well represented in both forest and grass land, especially the mongoose and civet families; some of these are noted for being far from wholly carnivorous, the palm civet, for instance, feeding largely on the cultivated crops of bananas and plantains when it can get them.

The squirrels as a group are typical of the farms and old farmlands and they are some of the few animals in the forest seen regularly by the casual observer. Of the seven distinct tree varieties found in the Gold Coast forest, no less than four are now largely confined to the farmed areas, while the other three keep mostly to the dense bush, two of them being rare. The largest of the farmland kinds is the red-legged squirrel, which is a little larger than the British red squirrel; it seems to have a natural tendency to tameness and almost all I have kept quickly became hand tame. The small forest squirrel is closely related to it and this is probably the most commonly seen of all, for it makes itself conspicuous in the early evening by running about on the bare dead trees where it has its sleeping hole. The trees selected are often isolated standards on the edge of clearings, so that these squirrels can easily be watched as they pluck leaves and haul them to their holes as fresh bedding.

The other two farmland squirrels are skulkers in the undergrowth and are seldom seen more than 8 or 10 feet above the ground; they do not live in holes but make nests of fibrous materials only a few feet up. The small green squirrel is the smallest of them all and, in my opinion, the neatest; it is only 5 inches long with a 7-inch tail and its whole coat is a pretty speckled green. Like all squirrels and many other rodents, their favour can easily be won by a few grasshoppers or mealworms, which they much prefer to nuts. The side-striped squirrel is closely related to the last but very different in appearance, being dark grizzled above, chestnut on the flanks with a yellowish stripe, and white beneath. It is generally of a cantankerous nature and in captivity is prepared to fight anything and everything, irrespective of size; it seems to be the same in the wild, for many specimens show tails with the end lost in a fight.

The association of these squirrels with farmlands and secondary forest is explained by

their present food habits, the red husk and flinty kernel of the oil palm fruit forming their basic diet. This palm is perhaps the most important tree in the world, yielding the red palm oil and the palm kernel oil of commerce; between the two oil-bearing parts of the fruit is a stone-hard shell used locally for making blacksmith's charcoal, but this is no obstacle to the squirrels and the many other rodents that eat the kernel. This is a very tight fit inside an acorn-sized shell but these animals remove it piecemeal through an amazingly small hole.

The other three tree squirrels are all larger, being about 12 inches in body length, and they belong to quite different habitats. The giant forest squirrel is mostly an animal of the tree-tops and it seldom leaves the higher trees except to get palm kernels and raid cocoa farms. The moist forest rich in *Raphia* palm is the main home of the other two; they are generally rare and little is known about them, but their chief food seems to be the fleshy husk of the ripe palm fruit. The slender-tailed squirrel has the duller coloration of the group, having an olive-brown coat and very dark tail, but the red-headed forest squirrel is quite the most handsome of all. The one shown here was a great prize, being the first Gold Coast record for seventy years and probably the first of the species ever to be taken alive and studied.

One form or another of the ground squirrel is familiar to travellers all over Africa, a sandy-brown creature about the size of a grey squirrel, with white stripes on the sides and a very bushy, thinly-haired tail. Two slightly different forms are found, one in the closed forest zone and one in the open country, the latter being much lighter in colour. This difference is very characteristic and is seen in many other species found through both zones, notably the leopard and harnessed antelopes, and it is only part of the general principle that mammals of the savannah forest are normally paler than their counterparts in the high forest.

This forest ground squirrel is now a very common animal of the town clearings and open farms, but the virgin forest has little to attract it and it is seldom or never seen there. It is thus another of the many rodents largely dependent on conditions created by man as he clears the land for residence and farming. In the Gold Coast the ground squirrel is a popular little animal and goes by many nicknames, such as 'the traveller', from its habit of dashing along the roads and paths, and 'the groundnut thief', from its fondness for robbing these farms.



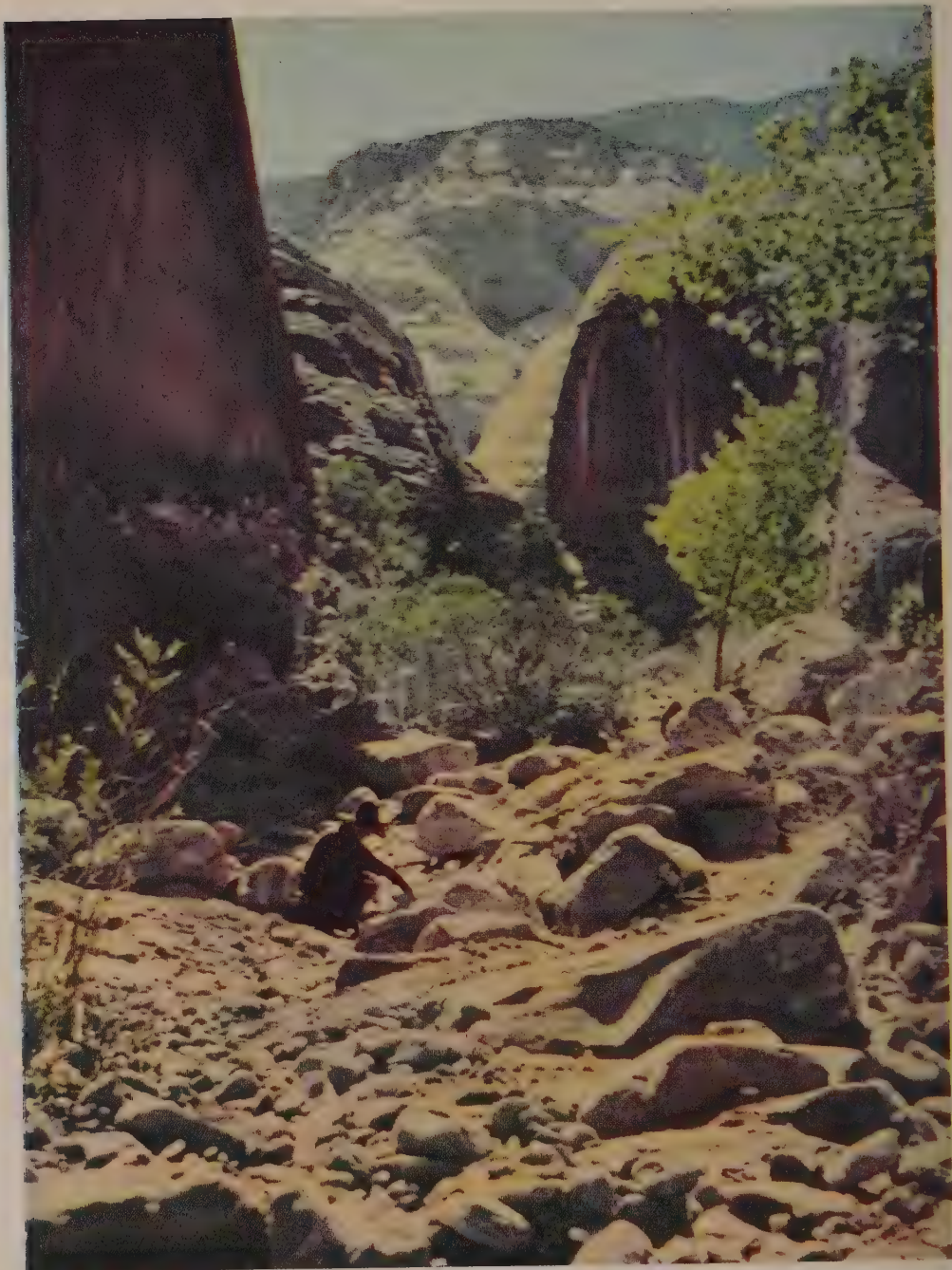
Monoliths in Monument Valley

The Battle-ground of the Gods

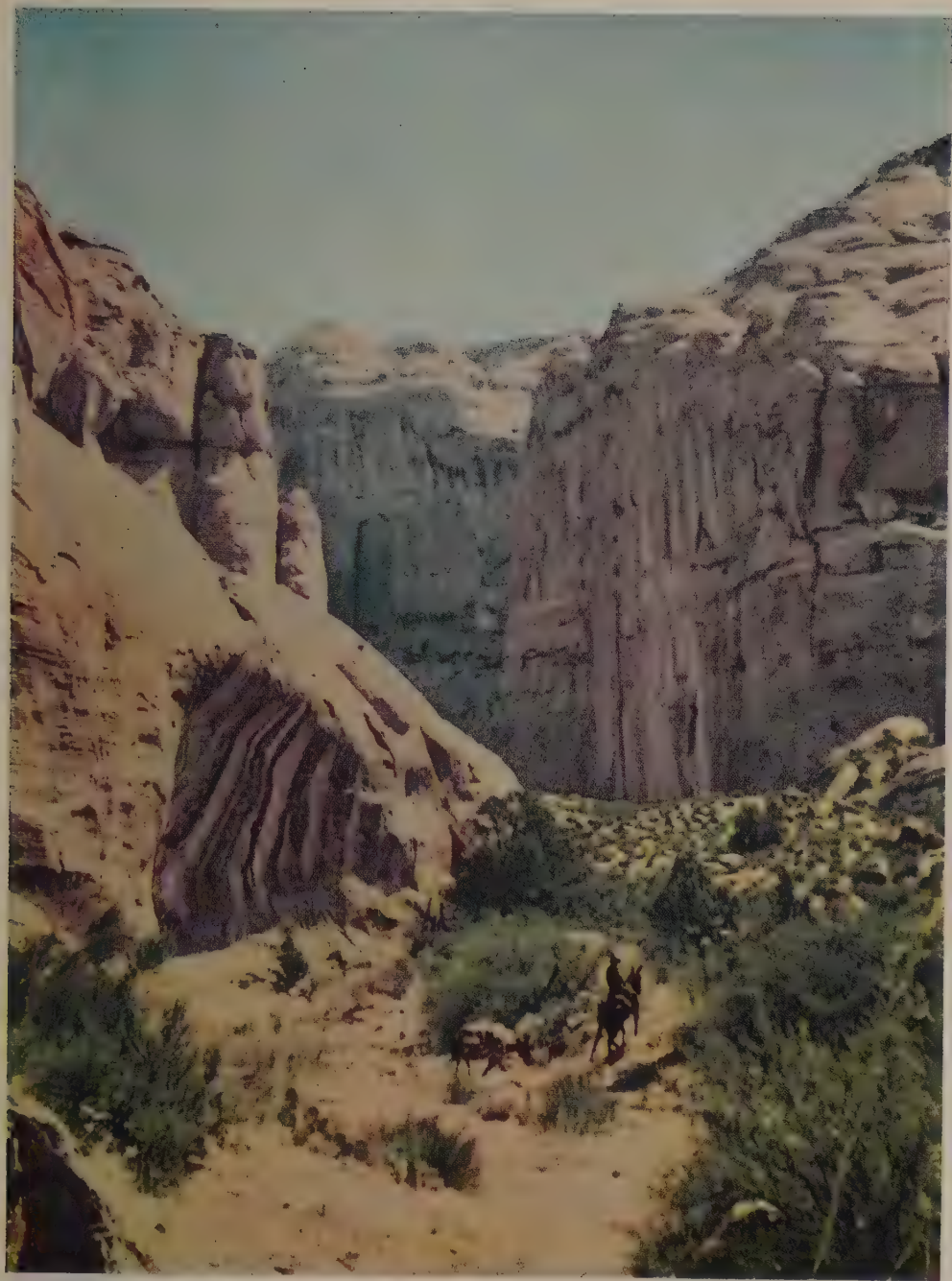
by E. O. HOPPE

"You have seen many wonders," said the old trader, screwing up the shrewd eyes in his wrinkled face until they almost disappeared, "but you have not seen the greatest of all, the battle-ground of the Navajo gods." We were standing outside a trading post not far from the Navajo Indian Reservation which is part of the Great American Desert. Yes, indeed, I had seen wonderful sights in my journeys from the borderlands of Arizona, Utah on the north, Mexico in the south and New Mexico and California east to west. I had looked on that masterpiece of Nature, the aptly named "Painted Desert", a vast, almost illimitable canvas of pulsating colour and perfect symmetry, fashioned with lavish prodigality from rich-hued rocks and sand, deepened with violet shadows and tempered with grey-green sage-brush. I had gazed down at the sublime spectacle of the Grand Canyon where whole cities, cathedrals, spires and pinnacles in gorgeous colours lay

beneath one's feet, where mountains must be descended before they are scaled, where there are strange and beautiful pictures that even the impassioned descriptions of guide-books cannot over-state. I had wandered through the silent petrified forests of Adamana, but I had not seen Monument Valley which lies hidden in a remote corner of America's South-West, on the border where Utah and Arizona meet. High beyond the rim of the Grand Canyon a tract of country stretches, nearly fourteen thousand acres in extent, with an escarpment rising about a thousand feet from desert land. It is seamed with numerous canyons, formed by tributaries of the Colorado River, in whose depths earth formations have created hundreds of mighty sandstone monoliths of weird and fantastic shapes and colours. Standing out separately from the main ledges of the escarpment, like giant sentinels guarding the entrance to some magic city, are pillars and bastions which form part



Navajo Canyon. This is one of several canyons in Monument Valley which are formed by tributaries of the Colorado River. The walls, varying in depth from 200 to 2000 feet, are of sandstone in—



—vivid colours and dull tan, and are either smooth, rounded or intricately carved. Travellers through Monument Valley may employ a guide who will provide horses and pack-mules for the journey



Kodachrome photographs by F. Fisher

Navajo women are fine riders and can be seen, astride their horses, taking their part in the many routine journeys occasioned by the long distances to be travelled within the Navajo Indian Reserve

of a gigantic amphitheatre that opens out into a valley so strange in exquisite beauty and grotesque grandeur that it is not to be described except in the language of fancy. Here are sweeping lines which suggest the noble curves of Norman architecture, there delicately chiselled pinnacles savour of Gothic beauty. Sculptures of unparalleled grandeur are grouped in striking formation. Obelisks shoot up to great heights and spires and monuments, minarets and the ruins of Grecian temples form an exquisite pageant of shimmering tints. It is difficult to divorce illusion from reality.

Here is a mystical city, set in the heart of space and silence. No roads lead to it, but a cactus forest, straight and forbidding, stands sentinel to ward off intruders. Indian legend says that in ancient times this was the battleground of the gods who have long since deserted their homes. These rock masses, incredibly like monuments of modern engineering skill, are ageless, untouched by human hand, wrought patiently and perfectly in the passing of countless centuries.

It was early morning when I gazed at this miracle of colour, and mysterious forms seemed to arise and float in a purple sea. Shadows faded into a curtain of haze from which temples, towers and altars rose slowly, becoming ever more clearly defined as over

the distance the sun-filtered atmosphere spread like a lavender mist. The effect upon me was one of wonderment and awe, and I could well believe the story told me by the traders that the Navajo Indians, whose grazing grounds are in this region, avoid the valley of these stupendous examples of erosion caused by the sun and the wind and the rain, as the dwelling-place of evil spirits. Only the force of circumstance will make them pass this way.

Yet, once in time, primitive peoples built their nests like swallows in the pockets of the cliffs and wrested a scanty living from the hard, reluctant bosom of the untamed desert. Their sojourn appears to have been of a brief and transitory nature; perhaps they were overpowered by the eerie environment of Monument Valley before they could firmly establish their habitations, leaving behind them but a few broken implements, bits of flint-heads, fragments of primitive pottery and, here and there, pictures of men and beasts scratched into the smooth cheek of the encompassing sandstone cliffs. Since their departure a reign of brooding silence has continued untouched by the warm breath of humanity for unnumbered years save for occasional chords of unearthly sounds which wander through vast and solemn cathedrals and massive organ-like formations.

English Porcelain Figures

by ARTHUR LANE

MOST English homes have inherited at least a piece or two of what the family calls "Dresden china"—little porcelain statuettes whose dress, if any, is vaguely reminiscent of the 18th century. Even the toughest of the younger generation have an amiable weakness for them—at any rate, more pieces, expensively bought, reach this country daily with troops on leave from Occupied Germany. By far the greater part were made during the wave of industrial expansion in Imperial Germany that followed the Franco-Prussian War of 1870. The State Factory at Meissen near Dresden set the pace for numerous smaller factories working in the same style. Among the crowd of foreigners, English porcelain figures are few; and even the pieces labelled "Chelsea", "Derby", "Bow" are often aliens in disguise—the work of ingenious Monsieur Samson in Paris, whose output of fake 18th-century porcelain for the English market has since about 1880 been a standing reproach to our own less enterprising manufacturers. In

short, there is much junk about. In its solemn moods, the 19th century 'revived' Gothic architecture; less seriously, it debauched the styles of all the ages, including that of the 18th-century Rococo when porcelain was at its best. But through the mask of the Gothic Revival we can still discern the splendour of mediaeval architecture, and it is not unrewarding to brush aside the Rococo Revival of porcelain and consider what the real thing was like.

We are too familiar with porcelain as a material to understand easily the fascination it exercised two hundred years ago. Like glass, porcelain is an artificial substance composed of natural materials that have undergone an almost magic transformation by fire. Take a piece of glass: who without knowing could guess from what raw materials it was made? The secret, sand fluxed and melted with soda or potash, has been continuously handed down among us since Roman times. The Chinese already knew how to make porcelain before



1. *Dancing girl. Chelsea: c. 1750*



2. *Figure of a boy. Longton Hall: c. 1754-8*

the 9th century A.D., but they kept the secret to themselves. Chinese porcelain was imported into Europe in increasing quantities from the 16th century onwards. Its hardness, translucence and whiteness delighted everyone; no wonder so many tried to discover how it was made, in order that they might make it themselves in Europe. Most early investigators assumed from its translucence that it was a superior kind of glass, and conducted

their experiments accordingly. At the end of the 16th century there was made under the patronage of the Medici family at Florence a very passable imitation of porcelain, akin to the wares that had long been current in Persia. The raw materials were glassy matter mixed and stiffened with white clay. From about 1690 somewhat similar imitation porcelain was made at Saint-Cloud in France. Other French factories started—Chantilly, Mennecey, and Vincennes, which in 1756 was transferred to Sèvres and given strong financial support by Louis XV. These so-called 'soft-paste' porcelains were yellowish in tone, and painted decoration fused admirably into their soft, glassy-looking glaze. But the preparation of the glassy and clayey materials was incredibly expensive and elaborate. The material was not plastic enough for delicate modelling, so comparatively few figures were produced until after 1770, when the right kind of clay for making true 'hard-paste' porcelain had been discovered in France.

True 'hard-paste' porcelain of the Chinese type is composed of two main ingredients. First, a feldspathic china-stone (called by the Chinese *petuntse*); and second, a white china-clay (Chinese *kaolin*), which is the same stone decomposed by long weathering. Wares made from them are fired to an extremely high temperature (about 1400° centigrade), when the petuntse fuses like glass and penetrates the substance of the kaolin, which retains its shape unaffected by the fire. China-stone and china-clay are of very local occurrence—agents of the Sèvres factory, knowing what they were looking for, had to scour France before finding them near Limoges in 1767. But long before then, the Germans had discovered the true nature of porcelain without a hint from outside. Augustus the Strong, Elector of Saxony, was informed that a young chemist named Böttger had conducted promising experiments to turn base metals into gold. Augustus at once decided to nationalize Böttger and placed him under arrest. From 1701 to 1705, with liberal grants from the Saxon Treasury, the prisoner tried gold-making at Dresden and failed. He was therefore put in a less comfortable prison for another two years. In 1707 he was switched onto the porcelain problem, at the instance of a Saxon nobleman named Tschirnhausen who had himself conducted profound researches on the fusing-point of various minerals. Two years of experiment on all the clays of Saxony were crowned with success. In 1710 the State Porcelain Factory was founded at Meissen near Dresden. But for various discreditable reasons it was not properly organized till after



3. *Jewish pedlar. Derby: c. 1765*

Böttger died of drink and discouragement in 1719. Then the brilliantly-painted tablewares began to issue from the factory in sufficient quantity to show the profits that Augustus had had in mind from the first. Miniature figures of Chinamen, dwarfs and actors were occasionally made in Böttger's time—probably inspired by the work of ivory-carvers. But the whole race of porcelain figures that so enchanted the courts of Europe in the 18th century was virtually the creation of a single genius—Johann Joachim Kaendler, a young sculptor who joined the Meissen factory in 1731 and served it till his death forty years later.

The design for a porcelain figure was usually modelled by the artist in clay or wax. From this 'master' figure, plaster-of-paris moulds were made in several sections—one for the head, one for the body, arms and so on. The wet unfired porcelain-paste was pressed in these moulds and allowed to dry; and the various moulded sections were then removed, moistened, and joined together to form a complete figure ready to be glazed and sent to the kiln. Fresh moulds could be made from the 'master' to replace those worn or damaged, and thus the same figure could be reproduced as often as required. The Meissen 'hard-paste' material admirably recorded every nuance of modelling in the mould, and, in comparison with the French 'soft-paste', was economical and easy to prepare. But the 'arcanum' or 'secret' of its composition, glazing and colours was guarded at Meissen by security measures like those that have bound many of us during the last few years. Only one or two key men knew the whole process; the rest knew only their own particular job. There were precautions to prevent workmen who knew too much from leaving Saxony. Nevertheless 'escapes' occurred in 1719, which led to the setting-up of a rival factory at Vienna with the help of a runaway 'arcanist' and enameller. A further 'escape' from Vienna in 1748 started several other factories in Germany; but Meissen still ruled the porcelain fashions till the disastrous invasion of Saxony by Frederick the Great in the Seven Years' War (1756-63).

There were thus, about 1750, two main schools of porcelain-making on the continent of Europe. In France, the factories for 'soft-paste' imitation porcelain were led by Vincennes-Sèvres: but their scope in producing figures was limited by the non-plastic nature of their material. In Germany, on the other hand, and especially at Meissen, the more amenable 'hard-paste' bodied forth great quantities of figures for export to all countries

in Europe—including Great Britain.

We were at that time regarded in Europe as provincials in the field of art. Our greatest painters—Holbein, Van Dyck, Lely, Kneller,



4. General Wolfe. Bow: c. 1759-60



5. *Young shepherd.* Chelsea: c. 1760-70



6. *Figure of a boy.* Derby: c. 1756-60



7. *Winter.* Chelsea: c. 1754-8

Verrio, Ricci; did we not have to import them all from abroad? In sculpture the names of Scheemakers, Roubiliac and Nollekens tell the same tale. Since Louis XIV revoked the Edict of Nantes in 1682 many industrious Huguenots had settled among us, and their influence was strongly felt in the minor arts such as silver-work. It is not surprising that when Britain in turn became infected with the Continental passion for making porcelain, the names of Huguenot silversmiths at once cropped up. Our earliest porcelains were of glassy 'soft-paste' akin to those of Saint-Cloud, Mennecey and Vincennes. Like the French

factories, ours experienced difficulties with this material, and for the first twenty-five years of their existence they tried one experiment after another to improve their paste and colours. The work of the period 1745-70 has a shy, tentative quality that endears it to the collector and connoisseur. Nowhere is it more appealing than in the ornamental porcelain figures. These were often based on imported figures from Meissen, but they lack that wicked, malicious spirit of caricature that stamps the work of the German Kaendler. In France and Germany the porcelain factories had the financial backing of kings and princes;



8. *Porcelain with ormolu mounts. Derby: c. 1750*

All photographs by courtesy of the Victoria and Albert Museum



9. *Nurse*. Chelsea: c. 1750-60

in England they were started by private individuals with limited capital and no steady patronage. Porcelain figures are, of course, utterly useless objects in the practical sense, and the English are a practical race. It is significant that of six early English factories that made figures regularly, Derby alone survived into the 1780's. The most successful factory, commercially speaking, was Worcester. Its promoters from the first recognized that table-wares of fine quality would pay best, and they wasted little time in pandering to what they considered a foreign and un-

desirable frivolity. A gentleman writing to his friend in 1766 praises Worcester porcelain because "they have not yet debased it by making vile attempts at human figures, but stick to the usefull"—no doubt an echo of remarks heard during a conducted tour of the factory.

Chelsea was probably the first English porcelain factory to start business, about 1745. The jeweller Charles Gouyn was chief promoter, but he was soon ousted by his manager Nicholas Sprimont, who had previously been active as a silversmith. Both were French Huguenots. The earliest pieces—sprigged coffee-pots, tea-pots shaped like Chinamen and so forth, are at once reminiscent of contemporary silver-work and of French (Saint-Cloud) porcelain. About 1750 a new kind of paste was used in a charming series of obviously experimental figures. The *girl in a swing* (fig. 12) is unpainted; at this stage fired colours were hard to manage, and the figures were often painted in unfired oil pigments that have since worn away. But there were also a number of independent establishments in London that bought white figures wholesale from the factories and decorated them in fired enamel colours. This has apparently happened in the case of the little *dancer* (fig. 1), who was modelled by the same hand as the *girl in a swing*. Both have a naïve charm that seems peculiarly English. Do they perhaps recall the children in those 'conversation pictures' by Arthur Devis, or the stiffly alert outdoor portraits painted by the young Gainsborough?

In the 1750's the Chelsea factory, now marking its products with the red-anchor sign, turned to figure-modelling in earnest. Ideas were to some extent borrowed from Kaendler's Meissen figures, now well known in England; other subjects were derived from engravings; and the *nurse* in figure 9 was adapted from a French earthenware figure of the early 17th century. But most pieces were entirely original, and the celebrated sculptor Roubiliac may himself have sketched some of the models. There were figures of dancers, actors, artisans with their tools, mythological beings, allegories of the Seasons and so on. The mellow richness

of the 'soft-paste' material, with its glassy surface, was enhanced by the transparent enamel colours applied in sparse decoration by the factory's own painters as in the little figure symbolizing *Winter* (fig. 7). But in the 1760's this restrained and delicate style gave place to one with an ampler sweep. The Muses and Arcadian Shepherds are borne aloft on scrolled pedestals; with serene graciousness, they flaunt robes that glow with enamelled embroidery and burnished gold (figs. 5, 11). We may well be proud of our Chelsea porcelain; it alone can be judged by European standards, and found worthy of comparison with the best ever made at Sèvres or Meissen. But bad coin drives out good; Sprimont's health was failing; and in 1769 he sold out and retired. The new proprietor was William Duesbury, a go-ahead Staffordshire business man with the eye of a vulture for drooping competitors.

Chelsea porcelain, like the painting of Gainsborough and Reynolds, represents English patrician taste in the 18th century at its highest level. If we turn to the porcelain of the other London factory, Bow, we find something which, accidentally perhaps, is more in the spirit of Hogarth. For example, the allegorical figure of *Charity* (fig. 10) is a prolific young female of the lower orders, such as the modeller might see any day scolding at her house door in the back streets of Bow. A set of sluttish *Muses*, probably modelled by the same man, have their names inscribed in a Frenchified form—*Clion*, *Eraton for the Love*, etc. Presumably another Huguenot was responsible for them.

But the factory was promoted by Englishmen—Edward Heylyn and Thomas Frye, the mezzotint engraver, took out their first patent in 1744; Frye applied for a second in 1748; and in 1750 Messrs Weatherby and Crowther became partners. At this early stage it was hard to find good painters and modellers. Thus, in 1753, the Bow proprietors were led to advertise in a Birmingham local newspaper for "Painters in the Blue and White Potting way, and Enamellers on China Ware . . . likewise Painters brought up in the Snuff-Box way, Japanning, Fan-painting etc. may have



10. *Charity*. Bow: c. 1750-55

Opportunities of Trial. . . N.B. At the same House, a Person is wanted who can model small Figures in Clay neatly." As a result, Bow porcelain often shows a sketchy, amateurish touch that is today very pleasing, since modern industrialization has spoilt our appetite for technically perfect finish. Yet Bow could attempt the grand manner with success, as in the heroic figure of General Wolfe (fig. 4). The plan of Quebec at his foot and the mourning-band on his arm refer to the scene of his triumph and death in 1759. After 1763 the factory fell on evil days. The ubiquitous



11. *Calliope*. Chelsea: c. 1760-70

William Duesbury apparently lent financial support for a time, before swallowing up this business in addition to that of Chelsea.

Chelsea and Bow were metropolitan factories—one might say that the latter had a strong Cockney accent. But in the 18th century the nobility and gentry were well scattered over the land in their country houses, and they, with rich tradesmen in the manufacturing towns, were all potential buyers of native porcelain as well as that imported from China. The Worcester factory, founded in 1751, catered especially for the country gentleman's family, with its technically excellent table-wares and ornamental vases. Only by a typical piece of detective work on the part of modern collectors has it been discovered that Worcester made porcelain figures at all. Figures were mentioned in an auction catalogue of 1769, and by two different visitors to the factory in 1779. An amateur drawing of 1784, designed as a frontispiece to Dr T. Nash's *Collections for the History of Worcestershire*, shows all the products for which the county was then famous; in one



12. *Girl in a swing*. Chelsea: c. 1750

corner are recognizable Worcester vases and plates, and also a figure—unmistakably the same as the *Turk* here shown in figure 13. Chemical tests prove that this figure and three other known models are made of a paste peculiar to Worcester, which includes soapstone from Cornwall.

A true 'hard-paste' porcelain, made of china-stone and china clay (again from Cornwall), was used for making some technically rather defective figures in factories at Plymouth (1768–70) and Bristol (1770–81). The Liverpool and Lowestoft factories hardly attempted to make figures, but a considerable number were produced between 1754 and 1758 by a

small factory at Longton, near Stoke-on-Trent, in Staffordshire, which was already a thriving centre of manufacture for earthenware and salt-glazed stoneware. The material of the Longton Hall figures was often faulty, and the harsh colours appeared in clashing combinations that might be condemned as insensitive or praised as amusing, according to taste. The little apple-cheeked boy (fig. 2) has a dull, matt surface, very different from the glassy brilliance of Chelsea. Comparison reveals the same contrast between 'London' and 'country-made' as is found in English furniture of the 18th century. Longton Hall was bought up in 1758 by the ineluctable William



13. *Turk*. Worcester: c. 1770

14. *Chinese*. Derby: c. 1750–55

Duesbury, and the workmen transferred to Derby—the only provincial porcelain factory where figures formed a really important part of the output.

Porcelain was being made at Derby by 1750, if not earlier. French Huguenots from London were behind the enterprise; Thomas Briand perhaps the first, followed by Andrew Planché. Some figures and groups attributed to Planché, for example the group of birds (fig. 8) and the *Chinese* in figure 14, show remarkably vivacious modelling and clear, pale colours that are quite distinct from those of the contemporary 'red-anchor' Chelsea. But Planché lacked financial resources, and in 1756 proposed taking into partnership John Heath "Gentleman", a local banker of means, and William Duesbury "Enamellor". Needless to say, Duesbury ousted Planché from the agreement in its final form, and later managed to buy out Heath. For this ambitious young man of thirty-one from Longton planned nothing less than to corner the English porcelain industry. He had appeared in London about 1750. Trained porcelain-painters were scarce in those early days, and the factories were ready to supply unpainted wares wholesale to anyone who would act as an independent decorator and retailer. Duesbury took up this line, and an extraordinary chance has preserved his account-books for the years 1751-3 (they are now in the British Museum). Entries show that he decorated and sold porcelain from the Chelsea, Bow and Derby factories. Figures mentioned are of types that can still be recognized today, though it is not often possible to distinguish which pieces were painted in their factory of origin and which by Duesbury. He seems to have been a messy hand with the brush, which he laid aside as soon as he got the business side of Derby under his control.

There was now a sharp increase in the output of figures from Derby, which presumptuously styled itself "the second Dresden". Until about 1760 quality was rather poor, with a bluish glaze and curious pale colours. Yet even their *gaucherie* sometimes lent the figures a wayward charm—as, for example, in the glum little boy in figure 6. In the 1760's Derby aimed at the same sumptuous effects as 'gold-anchor' Chelsea, but the modelling was on the whole dull and lifeless, the expression on the faces doll-like and insipid. It is really rather too charitable to Duesbury to illustrate the exceptionally fine *Jewish Pedlar* in figure 3, which owes much of its vigour to the Meissen model from which it was copied. After Duesbury bought up Chelsea in 1770,

the two factories Chelsea and Derby continued working as a joint concern until 1784, when the entire stock was removed to Derby. The figures maintained the sentimental Derby tradition rather than that of Chelsea; and the same models, with deteriorating decoration, were used till well into the 19th century. To this twilight period belong the unglazed white 'biscuit' porcelain groups that borrowed subjects from Angelica Kauffmann; their nature may be inferred from such titles as *Virgins distressing Cupid*.

Porcelain figures do not readily lend themselves to production on an industrial scale. Their fragile bloom depends too much on patient and dexterous handwork, whether in touching up the modelling before the assembled parts are fired, or in the subsequent painting and gilding. Duesbury and his successors at Derby commercialized the idea to the limit it could stand—perhaps further. Modern 'Dresden' figures from Germany seem lifeless and hard, even when they reproduce old models. For the last hundred years English manufacturers have wisely left them alone. When collectors and Museums turned their attention to old English porcelain in the second half of the last century, it was all but impossible to classify the material accumulating in their cabinets. No old factory records existed; few pieces bore factory marks. The history and achievement of each factory have been gradually worked out by comparing marked pieces with unmarked, by chemical tests of material, and by intelligent use of such finds as Duesbury's account-book and old auction catalogues. Many problems remain unsolved. Devoted persons are still grouting among the tombs to discover when such-and-such an obscure porcelain-painter died, or labouring through parish registers to find when and where his children were born. The Derby modeller Spangler turns out to have been a Swiss; mention of an illegitimate baby in the Zürich baptismal rolls of 1783 perhaps explains why he vanished from the Zürich porcelain factory without leaving an address. A study of English porcelain reveals the threads that bound our culture to that of the European continent at levels below the notice of the formal historian. It brings a thousand contacts with the social life of the 18th century and, like the journals of Defoe, invests the place-names we know today with the authenticity of their past existence. But, above all, English porcelain figures can still appeal to us for the same reason as to our ancestors. They inhabit a remote, miniature world of fantasy into which the mind can escape from ugly fact.

The Canadian Goes Home

by R. B. INCH

Articles in our February and March 1946 numbers gave answers from Australia and South Africa to the question: What effect have his war experiences had on the returning soldier and what changes, resulting from the war, is he encountering in his homeland? Mr Inch, a former newspaper man, served in the R.C.A.S.C. with the 5th Infantry Brigade, First Canadian Army, from Caen to Oldenburg

OVER there where the sun was going down was home, bright and warm in the mind of the Canadian soldier in Europe, a better land than he had ever thought before. That is what war does. He thought of home beyond the sunset in Sicily and Italy, from Caen to Oldenburg, on the seas to Spitzbergen, on the grim return from Dieppe. Also, perhaps, on Waterloo Bridge when the lights of peace shone again in the tower of the Houses of Parliament standing clear against the sky to remind him, as the darkness settled over triumphant St Paul's, of some of the things he would take back with him.

The poet said the Canadians would return

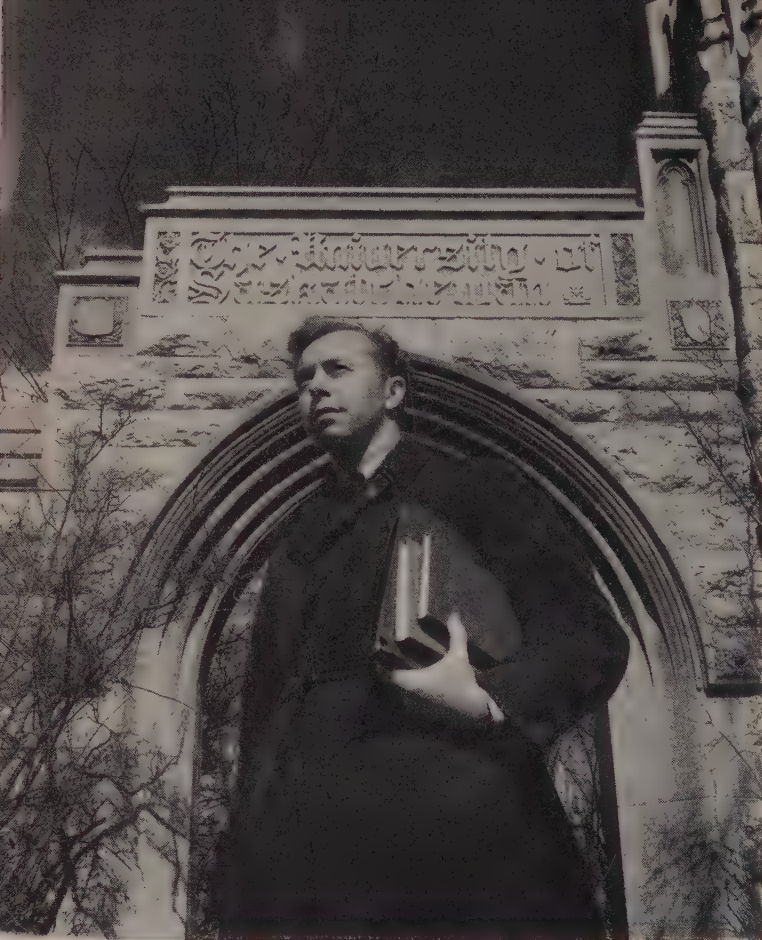
from their "Iliad voyagings"

... to build in lofty rhyme
Out of Laurentian rock and Norman lime
Memorial towers Canadian
Across a continental span—
To mix a mortar that shall never crumble
Before the blasts of war or wear of time.

More than a year after VE Day, when 400,000 veterans have been repatriated, many of the war-born sentiments are no doubt dulled in the struggle for rehabilitation. One ex-soldier writes: "Sometimes I think the war should have gone on until all those involved in it had through the natural course of events expired. After all it was a quiet life, no



Stanford, London



More than 50,000 Canadian veterans are taking university and vocational training, the Government having already spent \$25,000,000 on this account to date. 36,000 veterans have been approved for university training assistance. (Left) Ross Bates, ex-Air Force Navigator, who is studying pharmacy at the University of Saskatchewan. (Below) Discussion groups at the Veterans' Community Apartments in Saskatoon conduct "great argument about it and about" in the light of enlarged wartime experience. The Apartments, former Air Force and Army barracks, were purchased by the Saskatchewan Government in 1945 to house veterans attending the University and their families. The rentals were established by a 'crown company', the Saskatchewan Reconstruction Housing Corporation

All photographs, except two, from the Canadian Film Board, by courtesy of the C.I.S.



income tax to pay, no bills, no income at all to speak of, with its attendant expenditures." Another, who had spent his thirty-day disembarkation leave fruitlessly looking for a job, asked hopefully: "I could get a job in England if I could get back, couldn't I?" But Milton Gregg, V.C., the new President of the University of New Brunswick, tells of New Brunswick veterans who previously could not say anything disparaging enough of their native province now praising its woods, rivers and opportunities, eyes glistening with emotion.

HOME IS MORE SELF-CONFIDENT AND UNITED

Home is a different place, more self-confident and united, and while the full effect of the veteran's presence cannot yet be estimated, it is certain that he will add to both self-confidence and unity. He was proud of the service to which he belonged. Although not much was said, it was a proud day when First Canadian Army became operational in Normandy to take its place with the United Kingdom, United States and French armies. In the first World War only a corps was formed; in the second there were two corps of five divisions (two armoured) plus two independent brigades and an army establishment. And he liked the way First Canadian Army operated. There was a thrust and drive about its convoys. Its clean, clear-cut signs seemed to reflect precision and efficiency. And that despatch rider speeding down the road, back straight, elbows out: there was CANADA.

Similar pride has come back from the naval and air services. Canada's navy grew in personnel from 1774 to 95,000 and in ships from 17 to more than 900; more than 220,000 went into the R.C.A.F., which on VE Day had 48 squadrons operational.

Men from all parts of Canada and of all racial origins served. A minimum of 24.8 per cent of the male population between 18 and 45 went into the armed forces from each province and an average of 40.6 per cent. The Fifth Infantry Brigade consisted of the Maisonneuves, a French Canadian regiment of Montreal, the Black Watch of Montreal and the Calgary (Alberta) Highlanders, and the fighting quality of each was held in high regard by all. Because the Army represented a great united, *national* effort, the greatest in our history, and one in which we were associated with other members of the Commonwealth and United Nations, it has been suggested that the red, black and red formation sign of First Canadian Army with the golden maple leaf superimposed might well be the proposed new Canadian flag. This

would be appropriate for another reason: ex-Service personnel are among the chief exponents of a distinctive flag. Why should it have been the Union Jack, the flag of a Government which they didn't elect, that was flying on the parade square during their training? And on the European continent why shouldn't First Canadian Army, if it was on a basis of equality with Second British Army, not have had a distinctive banner? And, of course, the civilians of France, Belgium and Holland didn't have any flags specially to welcome the Canadians. Merchant seamen hold similar views. One wrote this to the Joint Parliamentary Committee appointed to recommend a flag:

Being a merchant seaman I can assure you that the lack of a distinctive Canadian flag is felt very keenly among native-born Canadian seamen. People in other lands, seeing the Red Ensign flying on our ships, take us for limeys. With all due regard for England, the feeling among young Canadians (especially merchant seamen) is that the time has come for Canada to assert herself with a truly national and distinctive flag. The lack of a truly Canadian flag is very painful and humiliating to us.

A Conservative Senator, saying that he was voicing the sentiments of youthful war veterans, his own son included, has proposed a white-and-red flag bearing a crown and a wreath of maple leaves and no Union Jack. He said:

The Americans overseas have often asked if we Canadians would get our independence after the War. Well, they figured that if we had the flag of Great Britain, her national anthem, the same kind of uniform on our fighting services, then obviously, we must be but colonial auxiliaries. Let Canada then cease her schoolboy rôle, and having come of age, wear long pants and speak and act as one having reached maturity.

Perhaps significantly, the report of the Committee recommending the Red Ensign with a maple leaf in the fly was never moved for adoption in the parliamentary session just closed. A runner-up for favour was sponsored by the League for a National Flag founded with French Canadian backing in 1942—a flag diagonally divided into white for the former French régime and red for the British with a green maple leaf superimposed, the nine points of the leaf representing the nine Provinces.

The new Citizenship Act defining Canadian citizenship for all purposes (it was only defined for immigration purposes before) is another symptom of the same feeling, as is the proposal to change "Dominion Day" to "Canada Day".

British subjects from outside Canada are not deprived under the Act of anything they enjoyed before, but they may now apply for Canadian citizenship.

IN FRENCH CANADA

It is within French Canada, however, that the most interesting consequences may be following on the return of the Service man with the liberal education and maturity that the war provided. The returned man is causing the stir in Quebec after this war which the returned man from the last war did in the rest of the country. It is just one generation delayed there. This time the French Canadian has come home to an honourable and friendly welcome. Resolutions coming into the national government offices from civic bodies in all parts of Quebec testify to this; they are backing the returned man in his

demands. He is not only the product of a longer period of training and of living with other men than the soldier of the last war—there was a better *esprit de corps* this time too—but of more rigorous training which has left its effect on body and mind. The training and experience have made him mechanically minded and he is showing a disturbing reluctance to go back to ancient methods of farming. The local priest is worried by his general attitude. He tends to prefer English speaking universities which until recently have been more noted for scientific and technical training than his own more classically minded ones.—And he is a bolder and more questioning spirit for a reason which goes to the roots of the French Canadian situation.

Life in French Canada has been very compact. The family, church and village life are tightly woven together, much more so than

Veterans returning to French Canada, in contrast with veterans of World War I, are receiving a warm and honourable welcome. They are more mechanically minded and are reluctant to go back to ancient methods of farming the land cleared by their forefathers along the banks of the St Lawrence





A community built to house Vancouver's wartime influx of shipyard workers. To meet this need in various congested areas the Canadian Government set up a 'crown company', Wartime Housing Limited

in the non-French areas. It was, therefore, psychologically a much harder thing for the French Canadian to answer the call to war and tear himself loose from the life which supported him. On top of this was his fear of non-French Canada, which is a by-product of the struggle for survival of French language and culture. The man who has come back to Quebec from the war has the buoyancy and satisfaction of having triumphed over these psychological barriers in his own mind. What is more, under a significant policy which took personnel for training to different parts of the country, he has seen the rest of Canada and not found it so bad. A former medical officer tells of a French Canadian nurse breaking down when ordered to take a course outside of Quebec. She was afraid. They would laugh at her accent, she thought. The officer finally promised that if in a week she wrote a personal letter saying that she was unhappy he would have her recalled. The letter, when it came, said that she was very happy.

The French Canadian has made friends with other Canadians from widely scattered parts of the country, as the others have made

with him, and there does seem some possibility that French Canadians will henceforth participate more in *national* organizations, not just French Canadian organizations; although it is difficult for one organization to speak for or to the whole country—also expensive. More than one-sixth of the people (2,200,000) speak French only, a fact not sufficiently noted in pre-war days by the military authorities who made war preparation largely an English-language proposition; another barrier for the French Canadian to surmount. The Canadian Legion, which seems destined to become the organ of the new as of the old veteran (about 50 per cent of its membership of nearly 300,000 are said to be new veterans), has also reflected the predominance of English: its journal is exclusively English and there are few French names among its officers and none among the principal members of its staff; a fact explained in part by the past tendency of French Canadians to send observers, not active participants, to the Canada-wide bodies and by the small number of French Canadian enlistments in World War I. It is interesting that Quebec Provincial Command of the Legion has recently started a journal of its



By courtesy of Royal Canadian Air Force

As a national war memorial Ottawa is to be made the centre of a 900-square-mile capital district area, uniting Quebec and Ontario. In the foreground is seen the memorial erected after World War I. Industrial structures on the far bank of the river will be replaced by governmental buildings

own, half in French, and that a former commander of the Maisonneuves was elected vice-chairman at the 1946 national convention held in Quebec city and attended by 744 accredited delegates of whom about 40 per cent were veterans of World War II.

THE NEW AND THE OLD WAR MEMORIALS

The proposed new national war memorial in itself and in its contrast with the one erected after the first war seems, to the returned traveller, to symbolize the changed position.

The first memorial of stone and bronze was completed just in time for the second war, a commentary on the inter-war years. In an impromptu ceremony to celebrate the 'deliverance' of Munich the figures representing peace and freedom were hoisted into position in the presence of the invited representatives of Nazi Germany, Fascist Italy, the United Kingdom and France.

The second memorial is to take a very different shape: 900 square miles to be developed as a national capital area, part in

Ontario part in Quebec—French Canada and English Canada united. At the opening of Parliament in 1945 the Speech from the Throne said:

In the past, the sacrifice of human life has most frequently been commemorated in monuments of bronze and stone. Such a memorial our capital already has. My ministers are of the opinion that something more expressive of the vision of a new world order would, at this time, be most appropriate. They believe that this vision would best find expression in the planned development and beautification of the national capital and surrounding area as a national memorial. Steps have been taken to plan the development of the city and region of Ottawa on both sides of the Ottawa river.

Mr W. L. Mackenzie King, the Prime Minister, spoke of making Ottawa "as worthy a place amongst the national capitals as Canada occupies amongst the nations as a nation".

THE YEARS BETWEEN

What else has taken place in the intervening years, to make the new war memorial seem so much more fitting than the old?

In line with the Munich ceremony Canada either disapproved of organizing force through the League of Nations and thus making it what the Prime Minister called an "international war office", or considered that, to use another of his phrases, it had been prematurely set to the high task of world control. Canada thought she lived in a fireproof house; in 1935 nothing happening in Abyssinia was held to be worth the life of a single Canadian soldier. We made clear "our own attitude toward the frequent demands that we should thrust ourselves into the European picture, take sides in the struggle of ideologies, make commitments in advance". To force the issue of commitments in advance, we said in 1939, "would bring out deep and in some cases fundamental differences of opinion, would lead to a further strain upon the unity of a country already strained by economic depression and other consequences of the last war and its aftermath".

On September 10, 1939, six months after this last statement was made, the King of Canada, on the recommendation of his Canadian privy council, was at war.

The retrospective veteran notes, first, that this was done without serious disunity, let alone the sometimes-predicted civil war; the non-interventionist appeal to the electorate of Quebec by the present Premier Maurice Duplessis being soundly defeated. Past policy was certainly questioned, as it was in the United Kingdom (not only mechanical transport but also a cleansed democratic spirit

carried the armies over the hills to victory), and there was a demand for a minister in the cabinet who would devote full time to the portfolio of external affairs, which by statute was held by the Prime Minister. Many Canadians felt that external policy was made in London, not Ottawa. In 1914 Ottawa was at war when London was at war: a full-time minister reporting to cabinet, parliament and people would emphasize that Canada's policy was Canadian and the only basis for unity.

The issue of conscription which soon appeared was tied up with this feeling: it, too, was surmounted. Not until the Boer War did the Government of Canada send an expeditionary force abroad, and this started an association of ideas, particularly in Quebec, to quote Professor Frank Scott writing in 1942, that "has never yet been eradicated—the idea that Canadian armies go abroad only in the interests of British imperialism". World War I added the idea of compulsion (conscription was adopted in 1917) at the insistence of the British-born or descended majority; and because of the way the matter was mishandled (for example, a Protestant clergyman was appointed as recruiting officer in Quebec) opinion in that Province was easily kept inflamed through the inter-war years. It was to Quebec that Mr King made his pledge of no-conscription in World War II, a pledge which resulted in the 1942 national plebiscite. Mr Scott, whose residence in Montreal gives him authority, wrote as follows:

The conflict (1939) started as an European war. . . . Not another country in this hemisphere considered the issue a life-and-death struggle between democracy and tyranny. . . . And for all the talk . . . about our free entry . . . the fact remains that from Quebec's point of view we had no right to neutrality—had not Mr Lapointe (Minister of Justice) said so? . . . In the same way the sending of an expeditionary force to England was accepted as inevitable, even though there was no vote in the Canadian Parliament on the question. But when Quebec saw the conscription issue being raised once again by a group of Toronto imperialists and a small clique in the Conservative party, and being used once more as a weapon with which to defeat a Liberal premier and the Liberal party, then Quebec closed its ranks. . . . Quebec voted . . . not on the question as to whether the Government's hands should be freed (from the no-conscription pledge) but on the question as to whether Canadians should be forced to defend England and the British Empire. It emerged surprised and strengthened by its own unanimity.

In the face of this the Prime Minister obtained from Parliament the right to send



(Above) Canada's 'barren north-land' holds vast mineral wealth. Isolated at Port Radium on Great Bear Lake near the Arctic Circle, 225 people worked in secret during the war to produce the pitchblende from which uranium was obtained for the atomic bombs

(Right) Under arrangements whereby the road reverted to Canada, the United States Government built during 1942-3 the Alaska Highway, here shown with the Rocky Mountains towering in the background. The Highway extends 1523 miles from Dawson Creek, Alberta, to Fairbanks, Alaska



overseas the troops conscripted for home service but did not use it until infantry casualties in Normandy, the resignation of Colonel Ralston, Minister of National Defence, and a threatened collapse of his Government forced him to do so, General McNaughton, who a few days before had succeeded Colonel Ralston on a policy of volunteer service, making the announcement in a rebellious House of Commons. No dire consequences followed. It may be argued that Quebec had made her point; that the issue of external affairs policy had to be faced in Canada and Canada's Parliament. Quebec, apparently thinking that Mr King had done all he could, voted for him again in 1945 and conscription is now an established principle—even though discrimination against the men who, under it, went as good soldiers overseas and into battle affords evidence of the bitterness engendered by the policy of war in Europe but conscription for service in Canada only. The Canadian Legion at its last convention refused membership to the approximately 10,000 so-called "zombies" (not all French Canadian by any means; there were "zombies" from all the Provinces) who actually served in a theatre of operations but did not *volunteer* for active service.

In 1941 Mr King began speaking of a new world order. In 1942 the Speech from the Throne said that "the myth of isolation has vanished from the earth" and that "it is now recognized that the freedom of each nation is bound up with the freedom of all". Recently Mr King has asked Parliament to amend the statute whereby the Prime Minister must be the Minister for External Affairs; and confidence in our ability to make our own decisions has grown with the extension of the diplomatic service to include High Commissioners, Ambassadors or Ministers to every member of the Commonwealth and to the U.S.S.R., China, France, Holland, Belgium, U.S.A., Mexico, Cuba, Brazil, Peru, Chile and Argentina, with other countries to be included shortly. This situation is in marked contrast to that at the end of World War I, when we had only a High Commissioner in London and a temporary military mission in Washington. Appropriately enough, The Rt. Hon. Louis St Laurent, a French Canadian, has been appointed Secretary of State for External Affairs under the amended statute.

ECONOMIC STRAIN?

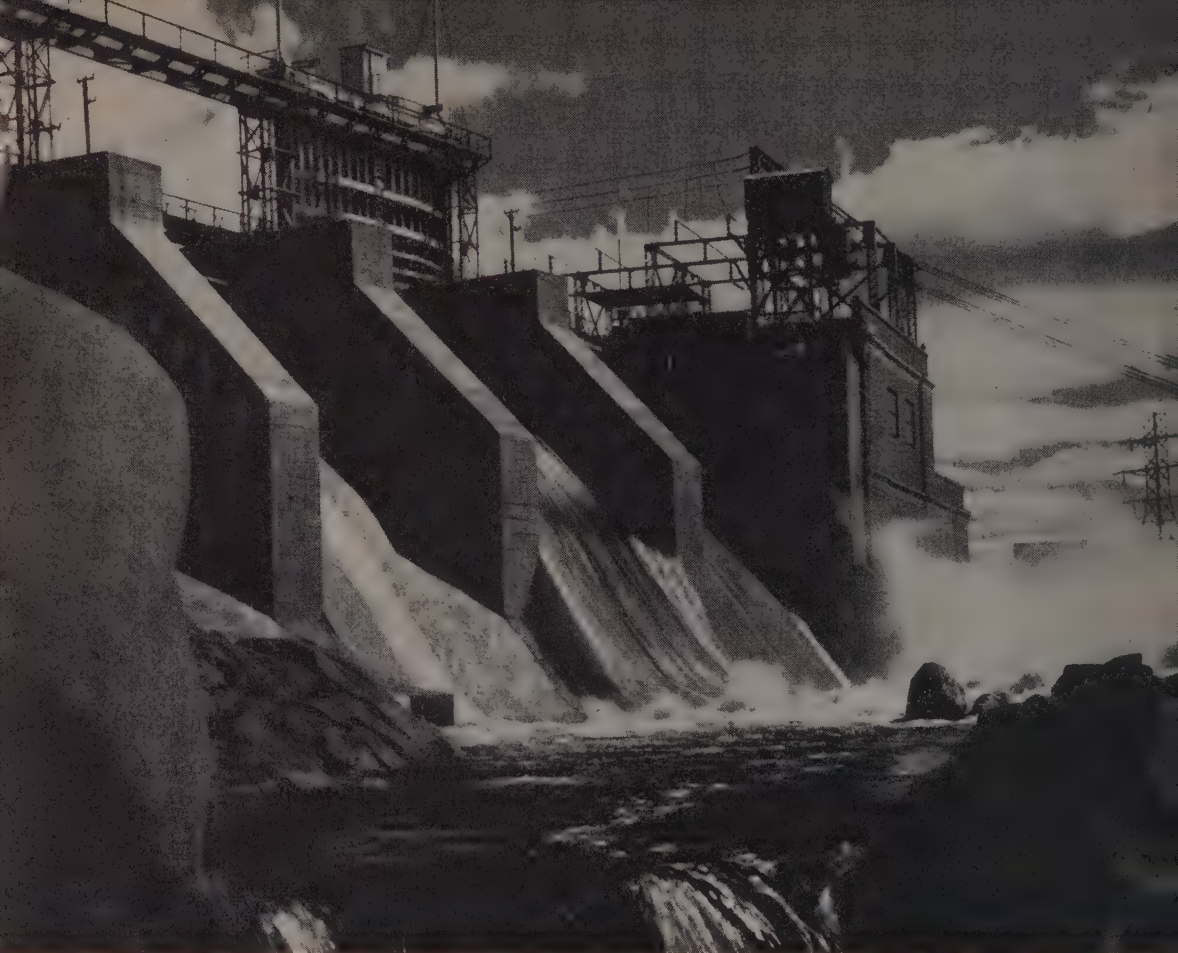
The observer notes further that the country whose unity six months before the second war was "already strained by economic depression and other consequences of the first war" put 1,000,000 out of a population of 12,000,000

into the armed services and more than 1,000,000 into war production, transforming the industrial life. Canada became fourth in air power, third in sea power, and fourth in providing war supplies among the United Nations. She doubled her production of steel and now is the fourth greatest steel producer. She is the world's greatest producer of nickel, asbestos, platinum, radium and newsprint, and second in wood pulp, gold, aluminium, mercury and molybdenum; third in copper, zinc, lead, silver, arsenic, and fourth in magnesium. Gross national production increased from \$5,500,000,000 to \$11,700,000,000. Hydro-electric power capacity was developed 25 per cent to a total of 10,200,000 horsepower.

There is a sense of strengthened social-economic institutions, reflecting new confidence in State action. There is pride in the accomplishments of price control (\$278,000,000 paid in subsidies by the end of 1945), the work of the nationally-owned Bank of Canada and the management of 'crown corporations' like the Polymer Corporation at Sarnia (valued at \$50,000,000, manufacturing 100,000,000 pounds of synthetic rubber a year) and the Eldorado Mining and Refining Limited in the far north on Great Bear Lake. The C.C.F. (Socialist Cooperative Commonwealth Federation) in Saskatchewan, in power for the first time in Canada and advised by a member of the United Kingdom Cadbury family, has established eleven 'crown companies' to manufacture clay, wool, leather and fish products and carry on other functions, including fur marketing. The National Government at Ottawa has just provided by law for crown corporations to develop patents arising from the greatly expanded National Research Council.

Membership in trade unions has been about doubled (to approximately 800,000) and they are reflecting the new sense of strength in their demands for shorter hours; a country which can do what Canada did in the war can provide fair working conditions now, they feel, and they are alert to the problem of distributing the benefits of technological advance. In 1939 the mass-production industries were almost wholly unorganized. Now they provide a large proportion of union membership. The United Automobile Workers have increased ten times, the United Steel Workers from 11,000 to 50,000, the United Packing-house Workers from 221 to 14,000, the United Rubber Workers from 1089 to 7000, the Mine, Mill and Smelter Workers from 176 to 12,000.

Family allowances, the veteran discoveries, are being paid from Ottawa for 3,299,000 children at the average rate of \$5.99 per



Canada's hydro-electric power capacity was developed 25 per cent during the war to a total of 10,200,000 h.p. This new power station near Arvida on the Saguenay River in Quebec sends 540,000 h.p. to the neighbouring aluminium plant, one of many items in Canadian industrial expansion

month and the National Government has proposed as part of a tax readjustment agreement with the Provinces that it pay old-age pensions to everybody above 70 without means test. The big wealthy Provinces, Ontario and Quebec, where most national business houses have their headquarters, have not accepted the offer, Quebec raising the question of provincial autonomy. A jest in Quebec is: "Mr Duplessis gives us autonomy and Mr King gives us children's allowances".

After this long catalogue the new memorial may seem appropriate.

WHAT HAS THE VETERAN BROUGHT BACK WITH HIM?

The sense of what is possible for Canada as a nation that has developed among the

Service men and women is now joining with that created on the home front. The new amalgam will resist the tendency for the national spirit to subside, splitting between English Canada and French Canada and influenced by the capitalist drive for return to the old days.

The separate Ministry of External Affairs is a sign that Canada has come of age, and her ability to fulfil the international obligations of maturity is emphasized by the fact that career men who rose during the inter-war and war years have recently been designated as deputy head of the Ministry in Ottawa, Ambassador in Washington and High Commissioner in London. Other signs of national maturity and unity are that since the war began (a) the Progressive Con-



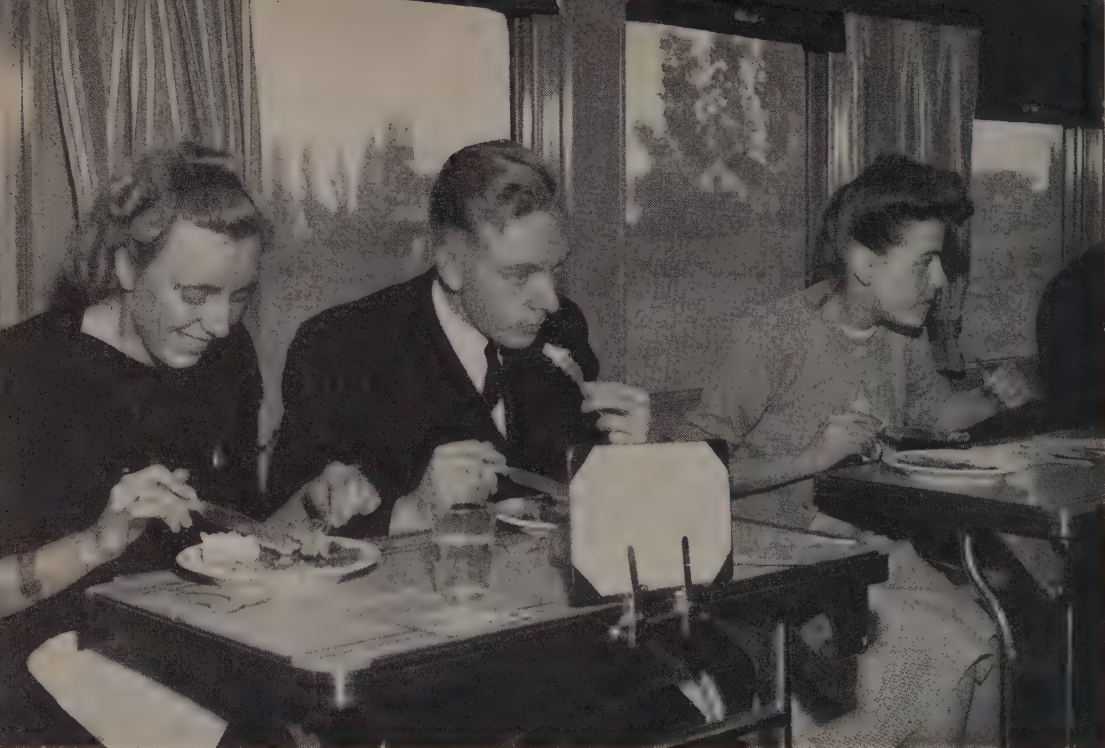
Canadian veterans have returned to find the area of State enterprise greatly widened. For example, the Government-owned Polymer Corporation at Sarnia, Ontario, manufactures 100,000,000 pounds of synthetic rubber a year. The spheres shown above are storage tanks for ingredients of the rubber

servative and C.C.F. parties have taken over buildings in Ottawa to house their national headquarters; (b) the Canadian Federation of Agriculture and the Co-operative Union of Canada have each established Ottawa offices; (c) educational organizations (education under the Canadian federal system is a provincial responsibility) plan to do the same.

In the economic field the Canada-United Kingdom wheat sale agreement may be a sign of continuing state action by a country which owned its central bank ten years before the United Kingdom took over the Bank of England, has owned half the railways (more than 20,000 miles) since they went bankrupt after the last war, operates the national airway system and is extending

notably the public administration of electric power under the long-established Hydro-Electric Commission of Ontario, and the recently established similar Commission in Quebec, as well as in Saskatchewan. Price and wage controls continue to make the State a major factor in economic life as industry and labour unions press their demands.

What else has the veteran brought back with him besides a keener sense of Canadian nationhood? It would be easy to exaggerate, but there must be hundreds who have been awakened or stirred by the grapple with Germany and the stay in the United Kingdom; for example, the fellow on guard in the Reichswald one night who said: "You know, I never thought the Government was



Montreal Star-Standard

A Bride from Britain and a Beefsteak Pie. What better introduction could she have to her new Canadian home, as the train rolls on across the broad and bounteous land?

any business of mine; now I see it affects everything." What line is political thought taking? There are few clues. In North-West Europe the soldiers voted C.C.F. Here and there a veteran thinks it was unforgivable for the United Kingdom to throw over Winston Churchill, but many have been influenced by the opportunity to observe at close hand the rise of the Labour Party to power as Nazi-ism disintegrated and crashed. One factor operating against a similar development in Canada is that so far labour unions, like cooperatives, have taken few steps towards political party affiliation, their inactivity in this respect being the result of a long non-partisan tradition, conflict between Labour Progressives (Communists) and the C.C.F., the influence of the Roman Catholic Church in Quebec and the mastery of the Canadian scene by the record-serving Mr King (Prime Minister since 1921 except 1930-35 and a few months in 1926) who, however, is expected to retire before the next election.

Few Canadians returning from the

European continent could have looked into the faces of the Londoners without developing a warm regard for the disciplined stand of British democracy. There is the memory of hospitality from all parts of the British Isles, perhaps especially Scotland, the Scots and the Canadians both being outlanders. Most ex-Service men would like the democracy of the English pub substituted for the Canadian beer dispensaries. One other item: more than 64,000 wives and children have come or are to come from the United Kingdom to Canada and more than 2300 from the European continent.

The great North American trains—built for a continental run of 4000 miles of forest and farm land, rocky wastes and prairie, lonely lakes and the Rocky Mountains—have now carried most of the voyagers home. These trains with their throaty calls had been a symbol of home. "Best train, best country, here we come", we telegraphed ahead. In spite of everything, housing shortage, unemployment, strikes and all, home still seems fairly bright and warm.

Animals in the Snow

Notes and Photographs by E. MEERKAMPER



Winter in the Swiss Alp is an attractive time for sports-minded tourists, but for many of the native animals it is a bleak, anxious period with the quest for food ever the most important factor. Driven by hunger, even the timid roe ventures close to a half-buried chalet where a pile of hay has been put out for it



And animals must drink. Some streams are still running and, during the long, quiet night, there has been a rendezvous of the hunter and the hunted—fox and mouse, weasel and hare—in search of water. Day breaks and there is no sign of life, but the zigzag of fresh tracks tells many tales of the night's exploits



Not a blade of grass to be found. The graceful young roe is not very strong and moves with difficulty through the deep snow in search of lichen and the spiky twigs of fir trees, with which it must now appease its hunger. At such a time, thoughtful school-children often put racks of hay for the deer in the forest



As for the fox, he knows how to look after himself during the long winter, but finds the lack of young small animals restricts his diet. Moreover, he is hampered in stalking by the fact that his red coat stands out against the snow. Sometimes he harries young roe-deer, first crippling them by biting their legs



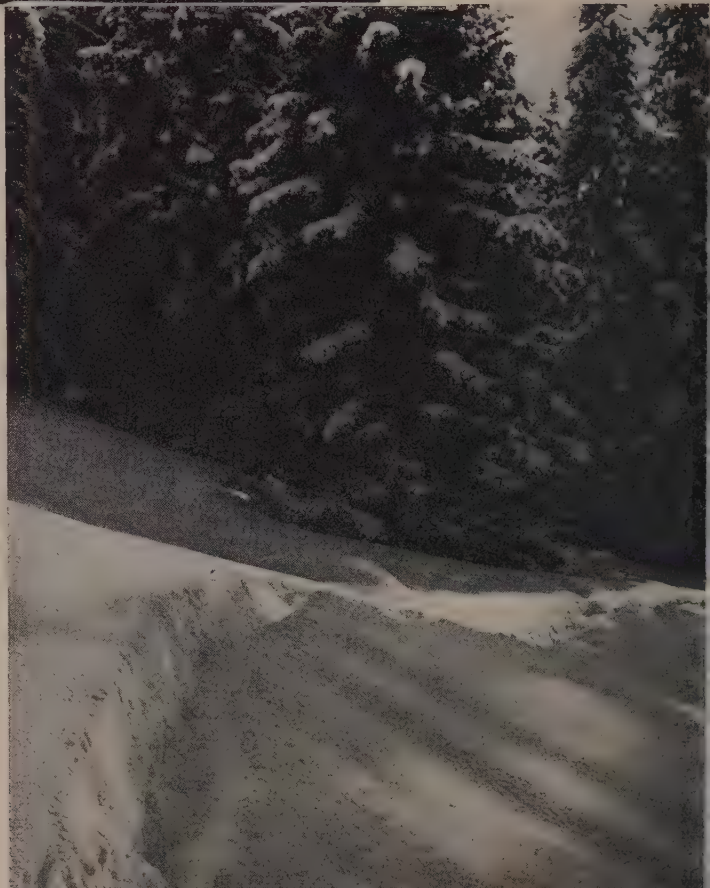
The woods teem with red squirrels, who live royally in winter on the stores of nuts they prudently amassed during summer months; and they are so tame they can be hand-fed by passers-by. This, however, does not prevent them from swarming over the verandahs of chalets, unscrupulously filching food left out by mistake



Six months of blissful sleep in a grass-lined burrow, and then the marmots emerge with uncanny punctuality about the 23rd of April. Snow still lies metre-deep on the open country which is their habitat. Having fed well in October they drink only water at first; then off on a search for patches of young green grass



(Above) Scenting danger the red stag stands poised, listening, alert, ready for instant flight. King of the woods, it is only when hunted that he is found in the open. He is strongly built and survives the winter better than most, living on the plants still to be found buried under the snow. (Right) Here a deer crossed the glade furrowing the snow with his long trot





(Above) A chamois on the look-out in the rutting season. Very wary, it is only on the mountain side, where he can roam undisturbed, that he is to be found. If the winter is mild he browses on patches of uncovered dry grass; with increasingly severe weather, however, he wanders down to the forest to feed on young pine shoots.

(Left) Light tracks of the agile chamois



Where the weasel met the mouse—a sad little story. Neither the hen-house nor a straying hare is safe when the weasel is abroad, cunningly concealed by its winter coat of white. But still the sun shines, and laughing people on skis will soon pass over the scene of the tragedy, making their own tracks in the snow.

Into the Ears of Babes

Geography in the Victorian Nursery

by P. H. MUIR

The illustrations to this article are reproduced from the author's collection as exhibited by the National Magazine Company in the National Book League's Exhibition of Children's Books of Yesterday

VICTORIAN ways with children, like other Victorian ways, were not as ours. Education was largely a question of cramming: the minds of children were regarded as jam-pots, and the object of education as the cramming into them of as much jam as the receptacles could be persuaded to contain. But the jam was spread very thinly over the powder of instruction, so that even recreational forms of education concealed a severe and formidable content at variance with a frequently charming and inviting exterior.

The Toys section in the catalogue of the Great Exhibition of 1851 is illuminating. It begins by quoting Faraday to the effect that "boys' toys are the most philosophical things in the world". The reference is explicitly to "the toys of the male sex" as these are "always directed to the more intellectual quality of the masculine understanding" (forsooth!); the toys "of the gentler sex" are more concerned with the kinder affections of the heart, tenderness, love and the domestic virtues.

The reader probably deduces from this pompous verbiage not only the didactic nature of the toys but a general air of regarding children as miniature grown-ups, an inference which is fully borne out by the fashions in dress at the time.

The argument proceeds. Franklin used a boy's kite to identify lightning with electricity; pea-shooters afford evidence of the elasticity of gases and of their economical employment when used expansively. "The sucker illustrates the weight of the atmosphere, and its equal pressure in all directions; and the sling, the hoop and the top, show the property of centrifugal force; when the top is in rapid motion it converts, for the moment, every spot and bruise on its surface into an elegant zone, and thus, also, imparts a good lesson in physiological optics."

The writer may well observe that these reflections "offer ample food for thought", although the thoughts they may arouse in us may not be quite those of the readers of 1851. If the present-day reader cares to extend the scope of the thoughts he might try out the "lesson in physiological optics" on the next

group of boys he meets spinning tops in the street.

If more of this sort of thing is required it can be found in the three volumes of Dr J. P. Paris' *Philosophy in Sport* originally published in 1832. He writes exhorting young readers to explore the attractions of "philosophical" toys and the delights of the "Thaumatrope" and the "Phenakistoscope"—both names actually used by publishers for children's toys.

The geographical games and toys of the period are almost all prime examples of this philosophical trend in the indoor amusements provided for Victorian children. Whether it be maps dissected to teach geography by putting them together as jig-saw puzzles (figs. 2, 3, 4), race games to familiarize distant parts of the earth's surface (figs. 8, 10), peep-shows of the marvels of burrowing under land and water (fig. 7), elaborate set-pieces to display the costumes and customs of a foreign city (fig. 5), or pretty and ingenious pictures to show the races that inhabit the earth (fig. 1) or its natural phenomena (fig. 9), the same motive is all-pervasive.

The jam was often extremely palatable and a great deal of ingenuity was shown in devising new ingredients and mixtures to tickle the juvenile mental palate. All the examples shown in the illustrations to this article are irresistible to the modern child: nevertheless their primary object was not to amuse; amusement was a means to an instructional end.

Jig-saw puzzles, for example, were at first simply maps pasted down on a wooden base and cut into a number of eccentric shapes. In Victorian times this type of jig-saw still persisted, but it had by then been relegated to the school-room. The examples illustrated here are largely pictorial, although a remnant of earlier practice remains in *Europe Delineated* (fig. 4) in which the four pictures shown are part of a pictorial border framing a central map of Europe.

Jig-saw puzzles, in fact, were invented in the 18th century by a firm of map-makers, Wallis & Son, the principal of which, John Wallis, was himself a well-known cartographer. Jane

Austen is a witness to their educational use, for in Chapter II of *Mansfield Park*, Fanny's cousins criticize her ignorance to their mamma by exclaiming that she "cannot put the map of Europe together".

These puzzles were expensive and elaborately made. Large ones in mahogany boxes with soberly engraved labels, the wood of the puzzles themselves usually being of mahogany also, cost half a guinea or more, possibly five or six times as much in terms of modern purchasing power. They made no use of colour but were printed in black only.

The jig-saw puzzle is full of interest for the student of education. It is a rare instance of an entirely new educational device, almost without background; and the date of its invention can be fixed with reasonable certainty as about 1760-70. Deducing the more complicated from the more simple, jig-saw puzzles might be expected to have evolved from boxes of picture bricks. The fact appears to be that the two toys are not historically connected and picture bricks were developed later than jig-saws.

It would be interesting to know when the name of jig-saw puzzle was first used for them. Originally they were known first as dissected maps and then as dissected puzzles. In 1880 the latter name was still in general use, whereas the jig-saw as a tool itself had already been generally superseded many years before. Thus the name jig-saw puzzle seems to have originated long after the saw itself had been abandoned. Possibly a new use was thus found for an obsolete tool, but fret-saws must have been fairly common by then.

The ingenuity of the invention is unquestionable. The fact that these puzzles have retained and extended their original appeal down to our own day is sufficient evidence of that. The whole idea of turning a rather dry lesson into a delightful game was sure to succeed, and the fact that the apt pupil scored an advantage in the construction of the puzzle by a better knowledge of geography must have appealed strongly to parents and school teachers.

The purely cartographical nature of the early jig-saws was soon varied, although the early innovators showed curious limitations. As the first jig-saws were maps it would be natural to suppose that their immediate successors would be whole pictures cut into pieces; but it was not so.

History and scripture began to be taught by similar means, but each piece of the puzzle consisted of one separate picture. One puzzle depicted the crowned heads of England. This, too, was devised from a sheet originally made to hang in class-rooms.

Each piece of the puzzle depicted one monarch and the apt pupil secured an even greater advantage in this kind of puzzle than in the maps, for the pieces were rectangular in shape with crenellated edges, the patterns of which differed only minutely, so that they were extremely difficult to assemble by pattern, although comparatively easy if you knew your dates well. Moreover, the clue afforded by the straight edges of the marginal pieces was absent in the earlier puzzles. In the historical set just mentioned the outer edges were also crenellated, while in many of the early map puzzles the final shape might be circular—to represent the hemispheres—or eccentric, according to the shape of the country depicted.

The map-makers themselves began to follow the notion of separate pictures. Only very slowly, some fifty or sixty years after its original invention, did the jig-saw puzzle begin to assume its modern form of one complete picture.

So far as it is possible to trace the development of the puzzle in detail the makers of board games seem to have been among the first to grasp this application of the original idea. Such games as *An Eccentric Excursion to the Chinese Empire* (fig. 10) were frequently available in jig-saw form. This was not such a successful venture as it might appear, for, although it ostensibly provided two games for the price of one, in fact, the board game could not be played without the initial labour of putting the puzzle together.

It is interesting to see in this game the familiar features of the race game, which are as modern as Gamages or Hamleys can make them, yet as old as ancient Greece. For the prototype of all race games is the *Game of Goose*, with its forfeits for those who alight on certain squares, which was certainly known to the Greeks long before our era began. It persisted into Victorian times, retaining many of the ancient features, although their symbolical significance was lost.

The ingenuity of the Victorian toymaker is clear not only in the four contestants, a pedestrian, a steamboat, a railway train and an aeroplane (in 1843!), but also in the forfeits, which tend to equalize the speeds of unequal contestants. The aeroplane is Henson's *Ariel*, developed from strikingly advanced designs in association with Stringfellow, the earliest attempt at aviation on a serious note. The model is said to have flown with some success and a company was formed with all the arts of publicity to exploit the aerostat commercially. Much use was made of this aeroplane by toymakers and an excellent jig-saw was published

representing the Aerial Transit Company's projected station "on the plains of Hindustan", which was only one of the far-flung outposts reputed by Henson to be within easy reach by his new method of transport.

The other board game illustrated here, *A Voyage of Discovery* (fig. 8), is one that would appeal to boys of any period, for it is full of adventures of every kind. Its geography is even less well defined than in the previous game, but its emphasis on the pioneering spirit when so much of the world still remained unexplored, or ill-developed—its date is 1836—illustrates another feature which almost invariably accompanies all geographical instruction in Victorian times, and that is the commercial advantages open to explorers. Many games of this kind had booklets with them which were not so much books of rules as miniature text-books of the world's commerce. It was quite usual for each square in the race game to appear in this book with a question against it, the answer to which the little players were expected to know, and if the player could not answer correctly the question attached to each square that he reached he would be required either to pay a forfeit or to miss a turn. The children must have been acutely aware of the harshness of this proceeding, for what you had fairly won by the turn of luck's wheel ought not to be taken from you because you did not know the natural products, the manufactures or some other elaborate details of the locality of your alighting place. One hopes that approximate answers were acceptable, but one may imagine, supposing that he ever relented sufficiently to allow his stepson to play games, what Mr Murdstone would have expected young Copperfield to pipe up with if he had landed at Windsor in the game of *The British Tourist*. The booklet tells us that the Royal Cottage was "placed on the site of Frost's Lodge, and was designed by Mr Nash . . . who has called to his aid the most interesting features of cottage architecture, combining these with considerable judgment, having to conceal its actual magnitude, which is incongruous with cottage architecture, and yet essential to the demands inseparable from its dignified appropriation". Gosh!

The moves were not made by dice for these were the devil's playthings, as playing-cards were his picture-books. A tetotum was used—one of them is in fig. 1—but it was a very unsatisfactory device and must have caused frequent arguments by the uncertainty of the number it showed, for it often fell askew, when either of two figures might be showing. In the *Voyage of Discovery* the tee-

totum is in the form of a compass.

These geographical board games varied in scope from local or topical venues, like *A Ride Through London* or *The Ascent of Mont Blanc*—the latter occasioned by the enormous popularity of Albert Smith's lectures at the Egyptian Hall in 1852 on his mountaineering exploit, rather on the lines of Longfellow's famous ballad of Alpine enterprise and disaster—to tours of the world or *The Game of Victoria, The Queen of the Seas; Descriptive of Great Britain and her Colonial Possessions*, with a gaily painted board, and an all too severe set of questions and answers searchingly directed to the inspiration of young pioneers and empire-builders.

Their pictorial appeal varied from a simple map of the district with a series of numbers on the principal towns to indicate the succession of moves, to the penny-dreadful appeal of *The Wonders of the World* (fig. 9) with its quite incredible sand-storm and its melodramatic earthquake.

The period from about 1820 to about 1860 is the most fecund in inventing bijoux for children, and it is also the period when colour was most effectively used in their decoration. Before that the manufacturers were feeling their way to the reactions of the child mind. It was, after all, half-way through the 18th century before John Newbery set up as the first purveyor of toy-books especially designed for children. He was a pioneer—he had no predecessor, although he soon had a host of imitators, some, like John Marshall, almost as good as himself. But the charm of his productions in modern eyes is in the naivety of their texts and the crudity of their woodcuts, except when Bewick's hand adds its exquisite touch.

It was not until Newbery's eventual successor, John Harris, and others like him conceived the notion of employing children to colour the woodcuts or copper engravings that a new stark and simple charm was added to these knick-knacks. It happened to coincide with a generally improved standard of design and production. Harris employed a number of highly competent artists, and although they did not always appreciate the technique of reproduction, and although the engravers on wood or copper were not always artistically equal to the excellence of the designs, a form of popular art emerged almost fully-fledged at once.

The method of colouring the books and toys is interesting. An original or series of originals was supplied by the artist in which the colours were laid in in simple block fashion; primary colours were used and the colourists

made no more attempt to depict half-tones than did the engravers of the blocks. The children sat round a table with piles of the book in sheets before them. Each child did one colour only, one applied the reds, another the blues and so on. This accounts for the fact that no two copies of the books of this period are ever quite identical, and if a new mixing of a particular shade was called for before all the sheets were exhausted, quite considerable variations might occur.

The decline began as soon as colour could be printed cheaply. The chromo-xylography of William Savage (1823) and George Baxter (from 1839) was mostly too expensive for use on children's playthings, and it was not until J. M. Kronheim substituted offset on a metal plate for the less durable wood block that "Baxtertypes"—so much nastier as well as so much cheaper than Baxter prints—became a regular feature in children's books. Chromolithography completed the downward process, and although Vincent Brooks and Owen Jones produced quite acceptable illustrations by this process, in the hands of less fastidious craftsmen the results are some of the vilest examples of printing ever seen.

But in the early Victorian period and slightly before it began, some charming work was being done. England and France set the pace, but Germany was not far behind. The English title of fig. 5, *The Life in Paris*, betrays its foreign origin. It was almost certainly produced in Leipzig, the home of origin of a whole series of similarly diverting and attractive toys of this kind with trilingual titles. The designer's signature on this one is G. W. Faber.

The Germans have always been apt copiers and adapters. The one peep-show illustrated here (fig. 7) is English in subject but German in origin. There is little doubt that the peep-show in this portable, pocket form was first devised in England. All the very early ones are of English design, manufacture and subject. Regent's Park, The Mall, The Queen reviewing her Troops at Chobham—these are the subjects of the early examples from about 1820 onwards. Expensive to produce, they seem to have had a limited public until the opening of the first part of Brunel's tunnel under the Thames.

This project had strongly attracted the public imagination not least because of its hazardous nature, and when in 1838, after the second inundation of it by the Thames had been finally overcome, the finished portion was thrown open, all London flocked to see it and no visit from the Con-

tinent was complete without a sight of it.

Because the Tunnel Company was short of money it was decided to capitalize the public interest in the undertaking and stalls were erected in each of the 64 bays where the supporting pillars met. These were let to vendors of souvenirs who did a roaring trade, and somebody soon discovered how readily the Tunnel lent itself to delineation in peep-show form. Its long series of arches made the illusion of perspective easy to produce and soon the toy was on sale in bewildering variety.

One of the most prolific producers was one Azulay, who had three stalls in the Tunnel and who bound some of his peep-shows in the cloth covers of old books. An extract from one of the leaflets he enclosed in his peep-shows gives some idea of what the scene was like inside the Tunnel:

"The Wapping shaft is occupied by a splendid Diorama, and a Piano Forte played by a small Steam Engine. The Saloon of Arts, for taking portraits, is placed in the Rotherhithe shaft. The brilliancy of the numerous [200 of them] [oil-] gas lights (Leslie's patent burners), the great numbers of visitors (48,000 per week) . . . cause the beholder of this marvel of Art soon to forget that he is under the Thames, but fancying himself in a place solely constructed for a Fancy Bazaar and Amusements. On the 25th of March in each year (the Anniversary of the opening of the Tunnel), a Fancy Fair is held, being the only place in the world where such an amusement can take place under the bed of a mighty river. The Thames Tunnel is open day and night, the charge for admission is one Penny each person. . . ."

Azulay could supply his peep-shows with the leaflet in English, French or German, but Frenchmen and Germans could buy them made in their own countries. A German one bears the typically Teutonic title: *Perspective Ansicht des Tunnels unter der Themse von Rotherhithe nach Wapping, London*. This one has the inapt design on its front of a Gothic cloister. Another—one of the best of all—is by the same Faber who produced *The Life in Paris*. This one has the titling in four languages, the fourth being Italian. A third—an example of which is illustrated—copies the more superior English examples in having an extra eye-piece at the top showing the shipping on the Thames above the Tunnel. A French example is rather curiously entitled *Pont sous la Tamise*.

No other spectacle captured the imagination of the peep-show makers and buyers to the same extent until the opening of the



1
The Earth and its Inhabitants, c. 1850. *A particularly charming Victorian educational toy. The globe is only 2" in diameter and is as accurate as size permits. The teetotum is typical of several slightly different forms. The one shown here is made of bone with the letters, or numbers, by which moves were decided, painted by hand. The costumes of all nations are also hand-coloured*

Great Exhibition of 1851. Of this there were a dozen or more peep-shows—some now comparatively common, one at least very rare—and also movable books, panoramas, juvenile guides, and one or more board games. All of these stressed to a greater or lesser degree not only the international nature of the show, but especially the romance of trade and exploration in distant and little known lands and the exotic nature of their products.

Modern designers may find the study of some of these toys not entirely profitless. The stories and jingles that children love are frequently of extremely ancient origin, and if Samuel Butler had known more about young children he could have scored some telling points from their habits in his theory of *Unconscious Memory*. The lore of the folk which appeals so strongly to them is matched by their natural appreciation of the art of the folk, and the charm of Victorian toys which appeals to us for its antiquarian flavour

is to them simply and naturally beautiful. They take in very easily the clearly blocked-in splashes of primary colour and the pleasing, child-like pictures which were produced by the Victorian toymakers.

In the educational principles shown in these toys the Victorians only just missed the mark. Their concessions to the children's obstinate desire for diversion were just a little too grudging, but the idea of instilling instruction by means of toys, was on the right lines. We smile at the blatancy of some of their methods, but they were feeling their way, and the extreme sophistication of some modern book illustrations intended for children does not entirely relieve ourselves of the charge of regarding them as small adults.

The truth about the Victorian designers and about some of our own also is probably that their work succeeds because it attracts the adult who buys presents for children, and that is not always the same thing as attracting the children themselves.



2

Zoological Gardens, c. 1860. Central portion of a jig-saw puzzle, the border of which shows many animals in the zoo. The well-bred children, following the camel's example, ignore the antics of the male parent with the bun. The ostrich appears to be about to take it out on the small boy



3

WALES



The Welch are principally descended from the Ancient Britons, they are an industrious and hardy race of people and are much engaged in rearing cattle and agriculture and pursuits.

FRANCE



This is indeed a luxuriant scene; the grapes are quite ripe, and they are gathering them for the purpose of making wine. It is called the vintage, and a cheering time it is, both for master and man.

LAPLAND



The rein deer is the Laplanders greatest treasure, it draws him on his journeys and supplies him with milk, and when killed, its flesh serves him for food and its skin for clothing thus answering the purposes of both the cow and the horse in England.

RUSSIA



In the northern parts of Russia as in Lapland, the inhabitants travel in sledges which glide over the hard frozen snow with amazing velocity, only drawn by horses instead of rein deer but here they seem to be going at no small rate in a sort of car one would suppose by the speed it was a government dispatch.

Europe Delineated, c. 1845. Four panels from a jig-saw puzzle on which twenty-one pictures surround a map of Europe. Note the quaintly worded legends beneath each

(Opposite) Railway Scenes, c. 1850-60. An early double jig-saw. On the back is a map of England and Wales. The incongruous piece seen in the left foreground is a hand-made replacement



5



6

Dean's New Book of Dissolving Views, c. 1850. *One of these pictures dissolves into the other by pulling a tab. Below each picture is the verse*

Man dwells where Volcanoes give vent
To raging FIRE, in Earth long pent:
He dwells where WATER is conveyed
By foaming cataract or cascade.

(Opposite) *The Life in Paris*, c. 1840. One of a series of toys produced by G. W. Faber, a German toymaker. All his toys are elegant, accurate and ingenious. The author of the article has a zoological garden, an African Camel-Corps, a flower garden and a village scene in similar style



The Tunnel, c. 1840. Peep-show of a world-famous London spectacle, Brunel's tunnel under the Thames from Wapping to Rotherhithe, opened in 1843 after eighteen years' labour and sold to the East London Railway Company in 1865. This was a popular peep-show subject and dozens of varieties were produced





8

A Voyage of Discovery, 1836. A board game played with a teetotum made in the form of a compass. It has all the essential features of a race game, with forfeits, premiums, etc., which in one form or another goes back far beyond the Christian era. A feature of this game is its emphasis on the pioneering spirit at a time when so much of the world still remained unexplored



Wallis's Elegant and Instructive Game Exhibiting the Wonders of Nature in each quarter of the World, c. 1830. How these crudities would have shocked the eminent—

9



10

An Eccentric Excursion to the Chinese Empire, 1843. A board game for four competitors, who are called by the intriguing names of Steamboat, Walker, Railway and Aerostat! It is especially notable for the depiction of Henson's aeroplane Ariel of which great things were confidently promised by its inventor. His design was sound, but steam demanded too heavy an engine

—cartographer who founded the Wallis firm! His son invented jigsaw puzzles and later went into the juvenile market in a big way. He published books as well as maps and games





Spooner's Game of Ancient History, 1850. Children must have gathered from this game that ancient history was a series of calamities. Indeed the designer has been more concerned with melodrama than with chronology. For instance, the scene of Pompeii shows the great eruption of Vesuvius in A.D. 79. The preceding scene in the game (not shown) is the siege of Jerusalem in 65 B.C. and the final scene is the conquest of Rome by Alaric in A.D. 410. The placing of these three scenes is in chronological order, but compare the dates in the circles with the correct ones given here

Hakluyt and the Elizabethan Seamen

by EDWARD LYNAM, D.Litt.

Dr Lynam's unique knowledge of maps has provided fascinating contributions to this Magazine. Besides being Superintendent of the Map Room in the British Museum, he is President of the Hakluyt Society and in that capacity he celebrates the Society's centenary with the following article

THE English have been called insular, restless, unpolitical, interfering, original and illogical, all probably with some justification. For we live upon an island, and the seas which surround us are a barrier shutting us off from the great continents and at the same time providing roads to all of them. Certainly we have been a race of inveterate travellers since long before Chaucer wrote his inimitable description of a pleasure-tripper of 1380, the Wife of Bath.

The first man who realized that this island kingdom might become a great commercial and maritime power, and in order to make her that organized the geographical knowledge of her people and exploited their roving instincts, was Richard Hakluyt. He was one of the many Englishmen who were born just when their country needed them, who by intuition as much as by study understood the national problems of their time, and by force of character and tireless industry led his countrymen to a new outlook and progressive action. His life was so filled with work, much of it still obscure, that we know very little of him personally; and although he won a reputation of the greatest honour at home and abroad, not a single portrait of him exists. Born in London about 1552, the son of a Master Skinner, he was fortunate in having as cousin and guardian a namesake who was the most learned geographer in England. When he was about seventeen his cousin showed him a great new chart of the world (probably Mercator's of 1569), and by his talk of foreign lands and their strange products so captivated the boy's imagination that he determined to devote his life to the study of geography, "a subject of high and rare delight". At Oxford he was ordained priest about 1577, but merely, one may guess, in order to assure himself of a steady income and of leisure to carry out the national tasks which were already maturing in his mind. In his few references to religious matters he appears

as an orthodox parson, a pillar of Church and State, of "Relligion alreadie established by authoritie". Ecclesiastical preferments came his way—he held, indeed, five benefices before he died—but these were rewards for services to his country, not to his Church. By 1580, when he was holding a Studentship at Oxford, he had mastered Greek, Latin, Italian, Spanish, Portuguese and French, and had read "whatsoever printed or written discoveries and voyages I found extant" in those languages. Realizing that the majority of his countrymen were still, in practice, living before the Age of Discovery and drawing their small knowledge of geography from "weary cosmographies untruly hurled together"—such as must have taught young Shakespeare about the anthropophagi and men whose heads do grow beneath their shoulders—he began to give lectures on geography according to the latest continental teaching.

In 1582 Hakluyt published his first collection of narratives of travel, *Divers Voyages*, dedicated to Sir Philip Sidney, his fellow-student and friend at Oxford. It was intended to instruct his countrymen, but it was also propaganda to arouse interest in and support for an expedition which Sir Humphrey Gilbert was preparing for America. Gilbert had received a Royal patent to a vast, and of course quite hypothetical, area north of Spanish Mexico and Florida, and Sidney had a grant of three million acres in it. Soon afterwards Walsingham, the Secretary of State, who was Sidney's father-in-law, employed Hakluyt on a mission to Bristol. There he made friends with the merchants of a city which since John Cabot's time had been foremost in supporting ventures to America. In 1583 Gilbert, after losing many of his men, reached Newfoundland and proclaimed it a British possession, which it has remained ever since. No settlement could, however, be made, and on the return voyage Gilbert and his little ship, the *Squirrel*, were

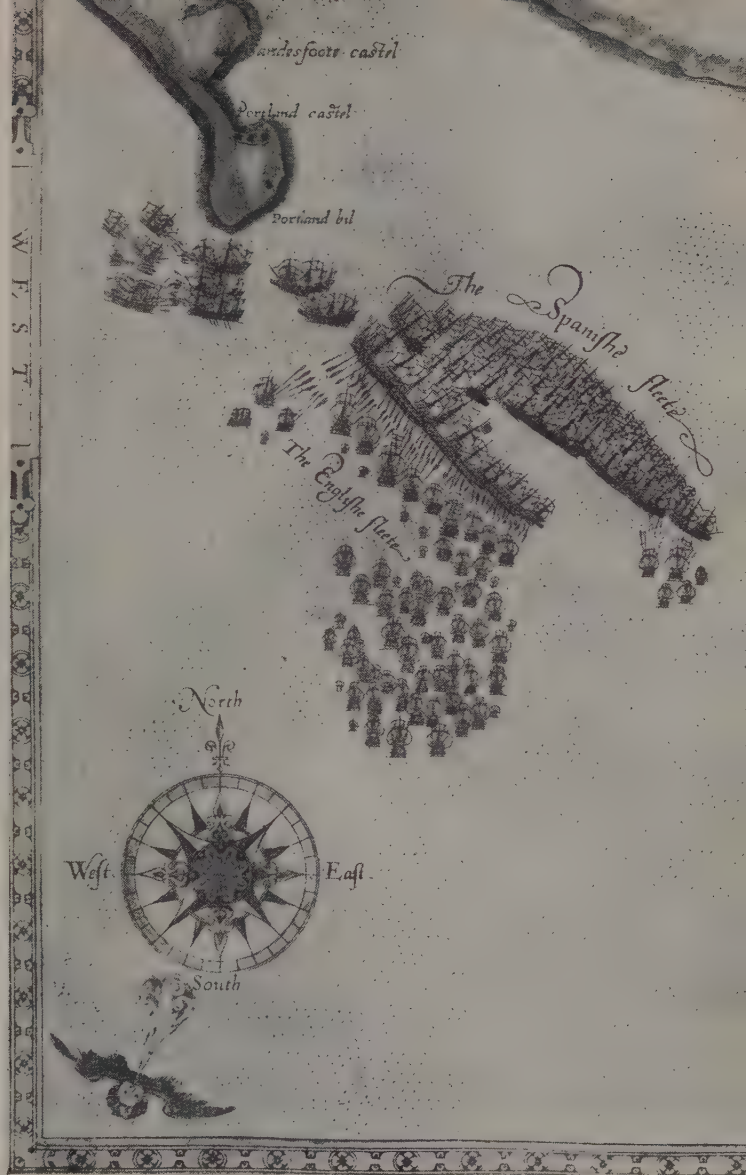
(Opposite) Part of South America, now Argentina, as shown on Mercator's famous world-chart of 1569. This was probably the chart which Hakluyt saw in his cousin's rooms and which first inspired him with a passion for geography

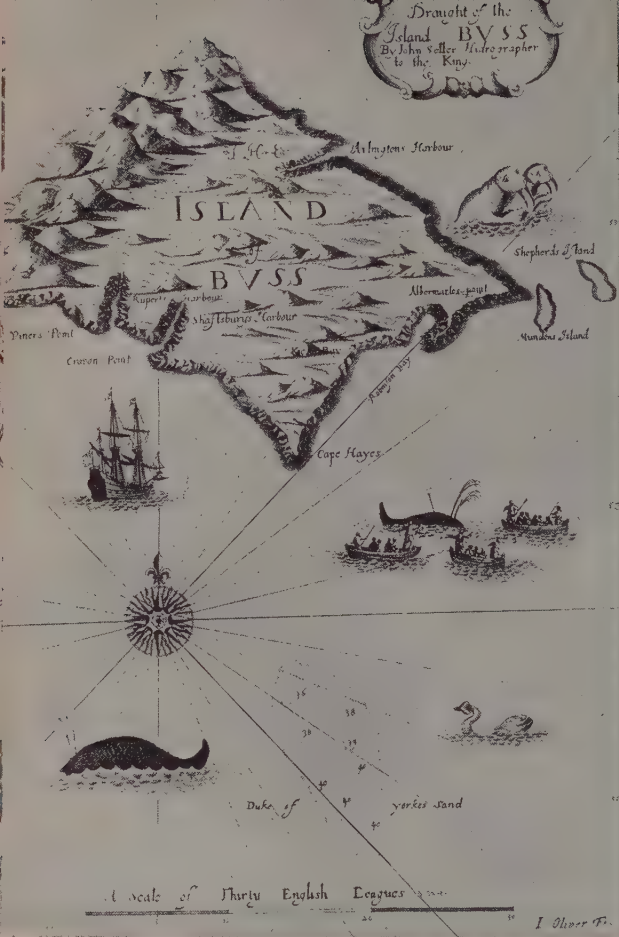
One of eleven accurate and beautiful engravings depicting the battles between the Spanish Armada and the English fleets between Land's End and the Goodwin Sands. Drawn by Robert Adams, engraved and published by Augustine Ryther in Expeditionis Hispanorum in Angliam vera Descriptio, 1590

venu nobility were enclosing common lands and treating their tenants so harshly that thousands of peasants and yeomen left their homes. Many, like young Shakespeare, went to seek their fortune in London, but many became sturdy vagabonds. The firm rule of the Tudors, the foundation of a national church and the ever-present Spanish menace had indeed created a national unity such as England had never known before, a unity which grew into a great national pride after the defeat of the Armada. But it was not enough. England was struggling for room. Drake and his fellow-captains fought to destroy the fleets of Spain on every sea and to rob her of her treasure from America. Hawkins and William Borough worked for a better and larger navy. The Queen sent

ambassadors to the Sublime Porte and to the Sultan of Morocco in the vain hope of securing safety and privileges for English merchants. And Raleigh dreamed of El Dorados, fabulously rich, and western empires where he would be uncrowned king, carrying out his own original ideas of government. But all these things Hakluyt saw as a whole, as a national problem. He saw them with the eyes of a geographer, of a student of the Age of Discovery, and to him the latent powers of his island kingdom were clear.

Before he left France Hakluyt had planned





The mythical island of Buss, south-east of Greenland, as portrayed in John Seller's English Pilot, c. 1673. It was first 'discovered' by one of Frobisher's ships, Emanuel, a buss of Bridgewater, on his voyage of 1578 for the Cathay Company. Hakluyt published two descriptions of it

which fifty-four, many of them imaginary, were named, would largely be raw materials, the manufacture of which in England would solve the problem of unemployment. In return, the colony would provide a chief market for English manufactured goods, especially for woollens. Eventually the colony would become a second England overseas, and render the home country practically independent of commerce with Europe and Asia. Beggars and criminals "whereby all the prisons of the islande are daily pested and stuffed" would be transported to labour "for certain yerres" before being freed. "Those of the clergie who by reason of idlenes here . . . are now always coyninge of newe opynions" were to be set to work converting the savages. At the same time the navies of the colony would destroy or capture the Spanish Plate Fleets, and all advances northwards by the Spanish would be barred.

The Queen could not and did not give Raleigh any help, but she rewarded Hakluyt's patriotic effort by presenting him to a prebend at Bristol. Raleigh's two attempts (1585-6) to colonize the district near Chesapeake Bay which he named Virginia after the Queen failed pathetically. Raleigh organized them badly; he never set foot there himself (the potato story is untrue and the tobacco story is very doubtful); the leaders whom he sent out, the famous Sir Richard Grenville and Sir Ralph Lane, treated the natives so badly that from being extremely friendly to the English they became our implacable enemies; and the time, with the Armada in full preparation, was most unpropitious. Several of the first colonists were rescued by Drake who, returning from a raid on the West Indies in 1586, called at Roanoke and carried them home, but many were killed by the natives. Nevertheless when Raleigh turned his thoughts to El Dorado and in 1589 made over many of his rights in Virginia to a group of London merchants, Hakluyt managed to be one of the grantees. His hopes for a successful settlement in America were, of course, raised by the defeat of the Spanish Armada, which crippled, at least temporarily, the sea power of Spain

all the tasks of his life. He believed that to preserve and widen its culture a nation should look both backwards and forwards, that it should know the truth about its past in order to gain understanding and inspiration for its future. Accordingly he determined to collect and publish, for the benefit and encouragement of his countrymen, every available record of English travel and exploration in all ages. Meanwhile he was given an opportunity to formulate his ideas on colonization. After Gilbert's death his Royal patent to settle colonies in America was granted by the Queen to Sir Walter Raleigh, who was then her first favourite. Raleigh, feeling that such a vast project needed assistance from the Crown, called in Hakluyt to be his spokesman. The result was a treatise, *The Discourse of Western Planting*, which Raleigh submitted to the Queen in 1584. It illustrates admirably the ideas of England's earliest empire-builders as well as Hakluyt's extraordinarily wide knowledge. The products of the colony, of

In 1589 Hakluyt published his collection of narratives of English travel, *The Principall Navigations, Voyages, Traffiques and Discoveries of the English Nation*, in one volume. It was a work to inspire any Englishman, but Hakluyt was not satisfied, feeling that there were many more records to find and publish. During the next eleven years he laboured to complete it, making many journeys to see returned mariners and take down their stories, and ransacking all sorts of libraries. For one narrative he rode 100 miles into north Norfolk to interview Thomas Butts, the last survivor of Hore's unsuccessful voyage for America in 1536. At the same time he continued a form of colonial propaganda which he had begun at Oxford and continued at Paris—and indeed continued until the end of his life. This was the translation, by himself or by men whom he paid, of every foreign work which would enlighten his countrymen about the achievements of other nations in America and the Far East, and would arouse them to emulation. The cost of all this labour and of publishing the translations he somehow managed to defray from his income as prebendary of Bristol and as Rector of Wetheringsett in Suffolk. But it was with good reason that he wrote in 1598: "how many long and chargeable journeys I have traueiled; how many famous libraries I have searched into; what a number of old records, patents, privileges, letters, &c. I have redeemed from obscuritie and perishing".

The East Indies on the world-chart referred to in Twelfth Night: "he does smile his face into more lines than is in the new map with the augmentation of the Indies". First published in the second edition of Hakluyt's The Principall Navigations, 1600, it was the work of Edward Wright, who perfected Mercator's Projection

By 1600 Hakluyt had won the confidence of a very powerful patron, Sir Robert Cecil, the Secretary of State, who in recognition of his abilities and his unselfish labours for his country had him appointed chaplain of the Savoy and Canon of Westminster. After 1600 he became geographical adviser to the newly founded East India Company (1600), which brought him into close contact with the leading merchants of London, not least with Sir Thomas Smyth, one of the founders of England's commercial greatness. Then came peace with Spain. Hakluyt now had all the necessary money and the influence with business men to revive the Virginia project, and he set to work at once as its propagandist. He used his knowledge and his pen to such effect that two of our most patriotic poets of the time, Michael Drayton and William Warner, wrote verses extolling his efforts. In 1604, on the formation of the First Virginia Chartered Company, he was one of the four London patentees and was offered the living of Jamestown. In 1609 he was one of the patentees





Among Raleigh's first colonists in Virginia, 1585-6, was John White, who made several water-colour drawings of the country and the people. These are now in the British Museum. With him was Thomas Hariot, who wrote a description of Virginia. Hakluyt, the propagandist, induced Theodor de Bry of Frankfurt to publish Hariot's text, with engravings after White's drawings, in a fine work, *America*, in 1590. (Above) Cape Hatteras with Roanoke island, headquarters of the colonists. (Below) Indians making a log canoe



THE Famous West Indian voyadge made
by the English fleet of 23 shippes and Barkes
wherin were gotten the Townes of S^t IAGO :
S^t DOMINGO, CARTAGENA and
S^t AVGVSTINES the same beinge begon
from Plimouth in the Month of September
1585 and ended at Portsmouth in Iulie
1586 the whole courtes of the said Viadge
beinge plainlie described by the prickd line
Newly come forth by Baptista B



Reproduced from "A Summarie and True Discourse", 1595

From a map, by Baptista Boazio, of Drake's expedition against the Spanish West Indies, in which Martin Frobisher and Richard Hawkins served under him: rich booty was taken. Sailing home in June 1586, Drake anchored off Cape Hatteras, and finding the Virginian colonists in a sorry plight, carried them back to Portsmouth. Hakluyt tells the story as related both by a colonist and by one of Drake's captains

of the Second London Company, and saw his dream of twenty-five years accomplished.

If any single man deserves the credit of founding an English colony in Virginia it is Hakluyt, not Raleigh, to whom that credit is usually given. During his life Raleigh was thoroughly disliked for his greed in amassing monopolies and confiscated lands and his arrogant untrustworthiness, and he did very little for his country beyond bequeathing to it some popular but generally fictitious legends. Hakluyt, as we know from the testimony of numerous contemporaries, was greatly honoured in his last years, and no less than four places in the Arctic regions were named after him by explorers. He died in the same year as Shakespeare, 1616. Although he had an infinite capacity for taking pains, he was no genius. Like many other Englishmen, he accomplished work of great national value by originality and industry. His life shows what the English character could achieve once it attained freedom, as it did under Elizabeth.

The Hakluyt Society was founded in December 1846, so that it celebrates its centenary this month. It was in many ways a product of its time. The great epoch of scientific exploration which had begun with Cook and in which not Spaniards but Englishmen took the leading part, was producing exciting discoveries almost every year and arousing among the educated classes an ever-growing interest in remote lands. In 1830 the Royal Geographical Society was founded. At the same time the Industrial Revolution, which had made England the greatest commercial nation in the world and was sending her wares to every port from China to Peru, had thrown a large number of craftsmen and agriculturalists out of work. This, with the bitter contest for improved social conditions which Labour began in the 1830's, led to an unprecedented flow of emigration to America and to all the present Dominions of the British Empire. Thus, just as in Hakluyt's time but with far more knowledge of what lay before them and generally assisted by the state or by Emigrant Associations, a large section of the labouring class was looking abroad to distant lands where they could begin a new life. Their spirit, too, was democratic and very different from that of the privileged noblemen and companies who founded our earliest colonies. One emigrant wrote back from the United States: "Here they need never know the fear of want, nor have their feelings distressed or insulted by either the degradation of pauperism or the pride of aristocratic wealth; here they will not behold hereditary titles, the reward of political apostasy and time-serving baseness".

The same period, 1820-50, witnessed the foundation of a new school of historians in England for whom, as for Hakluyt, no statement had value unless based on research among original documents. It was to men of this school, collaborating with members of the Royal Geographical Society, that the Hakluyt Society owed its formation. Its purpose was, and is, to continue Hakluyt's work by publishing the original accounts of explorers and travellers. Its publications differ from Hakluyt's in that every work is accompanied by a very useful introduction and footnotes, while his range has been greatly enlarged by the inclusion of numerous foreign narratives, all in English translations. Since 1846 the Society has published 226 stout volumes, including a new edition of the *Principall Navigations* and of several of the narratives contained in it, issued separately with notes to bring them up to date. Among the members of the Society and editors of its publications have been (to name but a few) some famous explorers, such as Sir Robert Schomburgk (of Guiana fame), Admiral Collinson (Arctic), Sir Richard Burton (Africa and Arabia), James Weddell and Charles Enderby (Antarctic), Count Teleki (East Africa), Sir Martin Conway (Spitsbergen) and A. P. Maudslay (Central America); notable Eastern travellers like Sir Henry Yule and Sir Henry Rawlinson; great scientists such as Charles Darwin and Lord Kelvin; distinguished archivists and scholars such as W. B. Rye, Sir Raymond Beazley and Sir William Foster; and not a few statesmen, including Mr Gladstone, Mr Herbert Hoover and Lord Curzon of Kedleston. In fact, the Society has seldom been without experts on nearly every one of the many subjects connected with travel in strange seas and lands, from meteorology to colonial administration.

While Hakluyt's objects were of national necessity, those of the Hakluyt Society, like its membership, are international. Its books are read in almost every country where English is understood; and as its officers and editors give their services voluntarily, its income, derived from the modest subscription of a guinea a year from each member, can practically all be devoted to the publication of these books. Hakluyt's reward for his life-long labours was to see his country becoming powerful on the sea and prosperous through its commerce. That of those who have worked for the Hakluyt Society during the last hundred years has been the consciousness that they were contributing to the knowledge of man and of Nature in every age and in every land, combined with the pleasure of editing many of the best books of travel ever written.

Fishermen of Negombo



By courtesy of The Empire Tea Bu

Sea fishing in Ceylon is mainly carried out by the independent fishermen of the coastal villages, who keep within about twenty miles of the coast. They use a variety of methods. To catch small fish near the shore, such as whitebait, a weighted circular net is often used. The old man knows well the movements of the fish and waits until he sees a shoal passing. Then the net is flung so that it opens out into a circle. If he is lucky he may catch some of the larger, predatory fish which pursue the small ones



F. A. R. Adams, A.R.P.S.

Prawn catching at Negombo. The haul may be sold on the beach or in the fish market, the white building on the right. Both fresh and salt water flow into the lagoon at Negombo harbour, which is used by river and canal craft bound for Colombo, as well as by sea-going vessels. The ships moored here are of the type used for bringing dried fish from the Maldivé Islands. The dried fish has such a distinctive flavour that no curry is thought good without it; and curry is eaten about three times a day by the Sinhalese



J. A. R. Adams, A.R.P.

Rod and line fishing. A schoolboy on holiday tries his luck with an extra-long rod. It is all in one piece and is made from a branch of the Kitul palm, which grows locally. He may land herring, whiting or sprats, or be after fancy fish such as angel-fish for the aquarium, which most boys keep in these parts. In the distance on the low, sandy shores coco-nut palms flourish, one of the few trees that thrive near salt water; by the fresher water in the lagoon opposite a large flamboyant tree spreads its branches



A. R. Adams, A.R.P.S.

A man whose face shows the simple dignity and poise of the fisher (Karawa) caste; leisurely people, but resourceful in danger or periods of hardship. It has been said that "once of the fisher caste, always of the fisher caste, no matter whether you fish for fish or you fish for bigger fry". The caste system is not so rigid in Ceylon as in India and not all Karawas are fishermen, nor all fishermen Karawas—



J. A. R. Adams, A.R.P.

—so in Ceylon a fisherman's son may not necessarily follow his father's profession. Free education gives many boys an opportunity to seek work in the towns where there are better pay and wider prospects. Wherever the boy goes, however, he will wear his charms to protect him from the 'evil eye' or illness. These are gold cylinders containing special slokas (propitious quotations from religious classics)



J. A. R. Adams, A.R.P.S.

For catching big fish the fishermen of Ceylon use canoes with an outrigger instead of a keel. Before they set off the placing of every item and person in the boat is carefully planned, a space being left for the catch, in order to ensure perfect balance. The canoes usually go out together at night, and, when the oil lamps on each are lit, the whole sea is dotted with a second, yellower galaxy of tropic stars



J. A. R. Adams, A.R.P.

The return is often perilous. The first obstacles to cross are the coral reef and sand bar, and this is possible only in a boat without a keel; then comes the tricky job of landing, with nothing but the outriggers to steady the fragile boat amid the violent turmoil of the breakers. Other fishermen in the community come down to the beach ready to help; the slightest error and the canoe is capsized or damaged



By courtesy of The Empire Tea Bureau

All is now quiet in the creek which lies behind Negombo. Gently the ripples touch the beach, for there is no tide here. Side by side the canoes lie drawn up on the sand. Undisturbed, fish glide and flit in the clear, warm water, for the fishermen sleep. Far above their huts tall coco-nut palms lean together whispering, their broad, fringed leaves responding to each passing breeze

Encounter in Dakota

by GRAHAM HUTTON

It wasn't what is called a "scheduled stop-over", our stay in that little rural town in South Dakota. We, a Chicago newspaperman and I, were on our way back to 'Windy City' by road from the Black Hills and the Bad Lands, the scenes of Custer's Last Stand against the Indian braves and of less reputable exploits of white bandits. A flat tyre fortunately delayed us; fortunately because otherwise we wouldn't have tried to make the cut-across that brought us, late and utterly lost, into a little community of some 2000 souls as the early winter twilight went purple and then dark behind us. We had meant to be in Sioux Falls, S.D., or Sioux City, Iowa, across the Missouri, by that nightfall. As it was, we were across the river all right, but some 80 miles behind schedule. And the schedule was pretty important because the Japs had attacked Pearl Harbour only a few days earlier. Our thoughts were on Manila, Tokio, Singapore, Washington, London and Berlin; scarcely at all on the Dakotas, the Great Plains and the Midwest.

Pete and I finished our ample supper at the only hotel and walked out into the little central square of the town. There were two rudimentary memorials in it: one to Custer, and one to some dozen leading early Dakotans who had been in the Civil War and had never come back. There was no memorial there to those who had fallen in World War I: so many had gone to that war that the little town had three or four plaques in different places—the school, two churches and the town hall. From half a dozen taverns and saloons we could hear the radio intoning newscasts and news commentaries from Sioux Falls, Pierre, Des Moines, Minneapolis, Omaha and even Chicago; the only voice we could recognize was that of a well-known and not too-well-liked Chicago commentator. We strolled into the tavern that had the most neon signs outside and propped up the shining rail. Argument was already general and heated. The boss, probably the Gus Dahlberg whose name modestly underlay the immodest names of beverages outside, was dexterously serving liquor while equally dexterously filling the rôle of moderator. The first remark which really made us prick up our ears was addressed by him to a huge blond giant in bluejeans:

"Whaddya mean, Fritz, we didn' hafta?

Like he just said on the radio, when they tied up their Axis at the Tokio end, they put the squeeze-play on us, I reck'n."

Ponderously Fritz replaced his stein on the counter and spoke:

"I don' see as we hadta. I don' reck'n this here United States hasta go out 'n' meet 'em. I reck'n we'd lick 'em a darn' sight easier if they fight 'emselves sick, 'n' then try to come at us—if," and he looked round knowingly, "if after *that* they ever do try it!"

There were scattered murmurs of approval, broken by a slow, quiet but rasping voice from a middle-aged, wispy-looking man in an old city suit, who looked out of place. Later, I noticed why. He wasn't sunburned. He was owner, editor, reporter, manager, advertising manager and proof-reader of the local bi-weekly paper.

"Aw nuts, Fritz," he wearily ground out, "you weren't in the first show and I was, so was Hank here, and Gus himself, and a whole lot others. I know that 1918 and the whole of the last twenty years looks now like rotten apples. But what'n Hell else y' goin' to do? Germans, Japs, Russians, British, Italians, Canadians, Chinks, Indians—why, Hell, the whole world's in it bar us; 'n' we'll hafta liv'n the kinda world *they* fix up for us. I reck'n the little yella devils saved us one Helluvan awkward decision. We *gotta* finish it up clean, this time. And it was because of folks like you, Fritz, that we pulled out last time a bit too soon, and left it to these British, French and others to make their power-politics in. You make me tired."

Pete muscled into the heated discussion. I kept a discreet silence, looking as wise or as foolish as I could—either way so I wouldn't be asked a question that would disclose my Englishry. Pete's incursion was welcomed when they heard him begin with the customary declaration of origin: "Folks, I'm from Chicawgo." At the sound of "Chicawgo" from the stranger, the whole tavern fell silent. They identified him with the *Chicago Tribune* almost automatically. As he went on, and they knew that he couldn't be, their interest waxed rather than waned. But what most interested me was that nine-tenths of them hung on his lips, eager to hear, to counter whenever he seemed superficial, to have their own points handled. After over an hour,

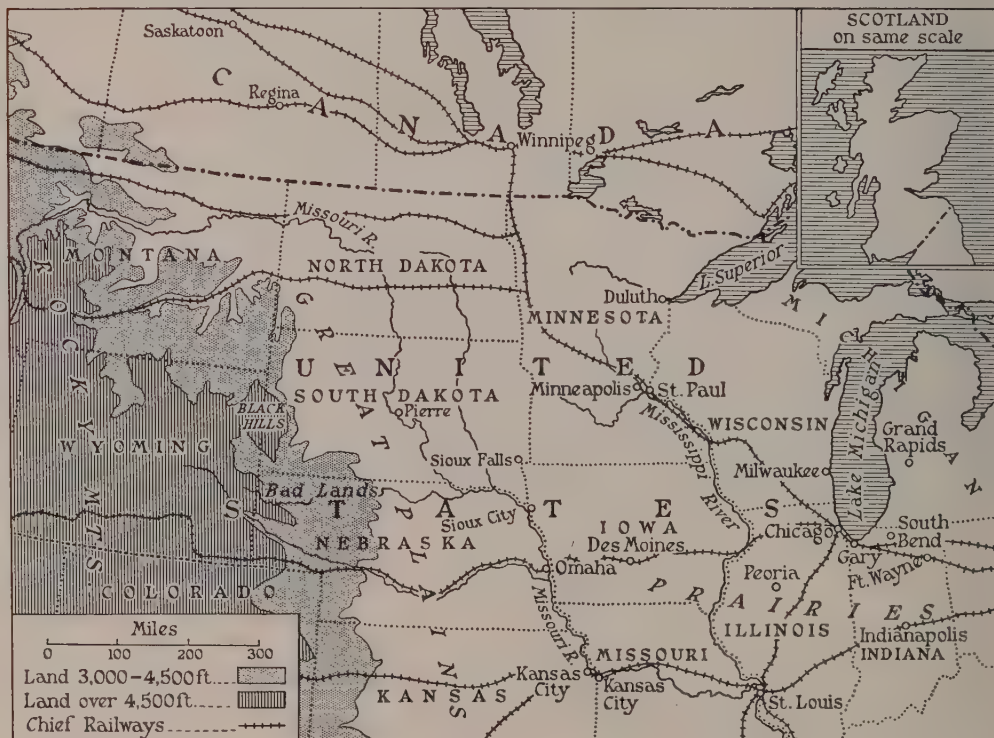
Pete, Dave (the local editor) and I walked over to the hotel; and that's how it was we spent all the next day in that little town in South Dakota. Dave said if we didn't, he'd go straight off and have the police prefer a charge against us for vagrancy, and have the hearing set for two days hence. Knowing he could and would do just that, we stayed; but by that time we wanted to, anyway.

* * *

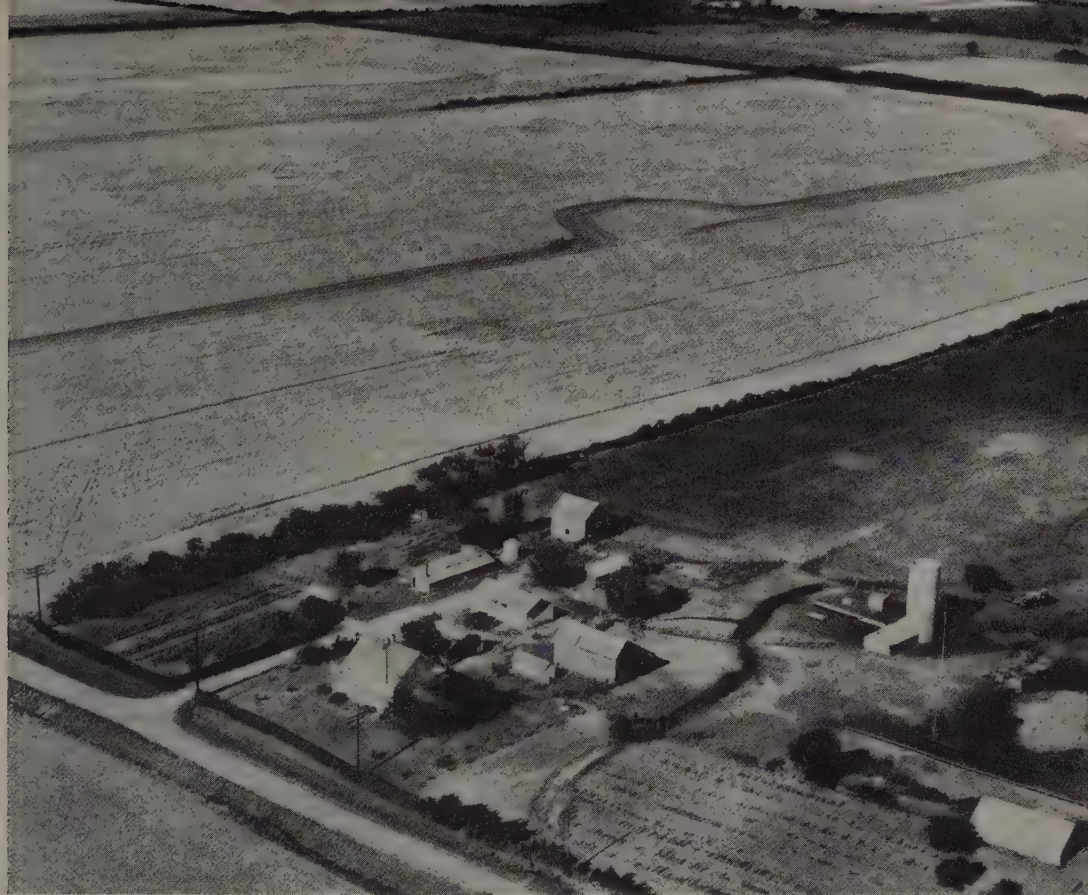
I piece together what follows from my notes of that day we spent there. The town was founded by discontented farmers who had sold out in Illinois in the 1870's and 'gone West'. It wasn't on any railroad. First they had grown corn, the Indian corn or maize to which they had grown accustomed in the Illinois prairie, but after 1900 they had gradually turned to the wheat and smaller grains of the higher land on the Great Plains which run from the prairie to the Rockies. Between 1880—the time of the last 'troubles' with the Indians—and 1914 the town grew up: from 47 souls at its origin in the '70's it reached 1000 in 1914. Of this increase, only about 100 souls were descendants of the settlers; the rest were immigrants from Europe and am-

bitious or discontented (often both) migrants from back East. In 1930 the census showed that most of the inhabitants were of first or second generation German immigrants; but after these, the composition of the town by the national origin of its people was surprising. In order of importance these origins were Scandinavian (Swedes, Danes, Norwegians), Russians (Ukrainians), Finns and Estonians together, native-born Americans, British and Canadians, Czechoslovaks (mainly Bohemians and Moravians), Hungarians, Italians, Poles (mainly Ukrainians and Ruthenians), Greeks, Serbo-Croats and Belgians. There were a handful of orthodox Jews from the Levant classed as Syrians, Lebanese and even one Egyptian; there were a few Chinese and Japanese; and there was a Filipino family.

They worshipped at many altars. The orthodox Jews established their first synagogue over a Galician tailor's and cleaner's store in 1905. The cantor was the local pawnbroker. The various members of the Greek Orthodox church built with their own hands a wood-frame erection—the only one I have ever seen that looked like a basilica though it was of rough timbers—in 1909. Then there were Roman Catholic, Episcopal, Congregational,



Stanford, London



From—"Say, is this the U.S.A." (Duell, Sloan and Pearce)

The economic hinterland of the Midwestern rural small town: farmsteads of about 80 to 400 acres equipped with solid buildings (note concrete silo) and separated by vast fields without fences

Baptist, Methodist, Presbyterian and two differing Lutheran churches; an undenominational evangelical mission-hall; a Christian Science church which came in 1920; a place of worship—you couldn't call it a mosque—for Bosniak Moslems, over a drygoods store, which ran from 1901 to 1927; and a Quaker Meeting which had begun in a private house in 1887 and was still flourishing.

The town had become a town, and not a mere central cross-roads hamlet, because as the county was large and the county town 40 miles away, the farmers needed a marketing place and their wives a source of supplies, services and so on. In 1903 an enterprising Yankee had made a flourishing business out of gravel pits and stone quarries just out of town; and from that had grown a cement and constructional business. The automobile had led a foresighted Bohemian to start a trucking business which now covered half the wide

county, and ran as far as Omaha, Pierre, Des Moines and the adjoining cities of Sioux Falls and Sioux City. Thus, much later, the internal-combustion engine had replaced the railroad which had never come to the town, and had thus developed its trade with the outside world. The usual chain stores had opened between 1910 and 1920, but most of the stores on the two second-class highways that bisected the central square were in the hands of first-generation immigrants or their American-born children in 1941. The town's economy was geared to the life of the farms. These ranged in size from about 80 up to as many as 400 acres; and the economic hinterland of the town, the zone of farm land which drew sustenance from, or in turn sent it to, the little metropolis, extended for some fifteen miles around. In that zone there was nothing but separate farmhouses, cut off from each other by vast unhedged and unfenced fields,



By courtesy of U.S.I.S.

(Above) *The modern Midwestern Main Street has progressed far from the wooden-shack stage. Large saloon cars of visiting farmers and their wives crowd the broad roadway lined with handsome stores.*
 (Opposite) *With all their variety of racial origins, Midwestern farmers are distinctively American*

save where some farmer raised, near his buildings (because of the severe winter), a few head of cattle.

The voters in the township built their school-house with their own labour in 1882. It burned down seven times before 1911, when the first stone school was erected from the Yankee's quarry. Between then and 1935 it was regularly enlarged; and in the latter year a big new one was put up with the aid of State and Federal funds, providing for 'grades' right through high-school courses. An old Catholic-Liberal Rhinelander who emigrated from Germany in 1849 came from Sioux City, Iowa, and started a weekly newspaper on a hand-press in 1891. Electricity in bulk did not come to the town till 1922. Indeed, the town did not install its own water supply and main drainage till 1916. But it had brick and stone and cement for houses, and timber was not far away in the North Woods, so its homes and stores and public buildings were solid and handsome.

Upon this little town, still geared primarily to farmers and farming, descended the whirlwind of World War I, the disastrous mortgage-ruin of America's farmlands that followed it, the slump in the prices of world primary products following the bumper surpluses of the late 1920's, the financial crashes following 1929, the agricultural rehabilitation programmes under the New Deal after 1933, and —just as security and stability seemed ahead—the hurricane of World War II. All this happened to a community drawn within their own living memory from half a dozen races, three continents and at least twenty nationalities—most of which could never get on with each other, let alone permanently live cheek by jowl with each other in the same isolated community, in Europe. Even in 1941 when Dave took Pete and me round the place, we found ourselves talking with Danes, Russians, Austro-Hungarians, Italians and Germans who, hale and hearty, remembered as part of their personal experience Disraeli and Bis-

marck meeting in Berlin to bring "peace with honour".

One old Russian Jew, born in Tarnopol longer ago than he could say, remembered the rumpus kicked up by a man called Marx whom, apparently, the British were subsidizing to subvert the allegiance of Russians to their Little Father; but he didn't seem very certain of the man's nationality, and we gathered it might have been the grandfather of the gifted Marx Brothers whose whimsical faces stared at us from outside the twice-weekly movie-house over the way.

* * *

Pete and I went back to see Dave in June of 1945. The place had changed: "Not exactly so as you'd notice it", as Dave had said in his invitation. But we noticed it all right—in little but eloquent things. There wasn't a new war memorial yet, but out of 2000 inhabitants, or less than 800 males over the age of 18, over 100 had gone into Uncle Sam's uniform. Over 150 young people of both sexes were in the armed forces. At that time, twenty-three would never come back to that little dusty square in South Dakota. They lay for ever in unpronounceable, unimagined far-off places of whose peoples, as a British Prime Minister once said, "we know nothing".

On the streets, the absence of the young was as striking as their presence was in London, Paris, Rome, Berlin and less well-known corners of the earth. The town was so small that everyone felt their absence, everyone mourned those who wouldn't return. It was as if the town had lost part of itself, its own lifeblood. It didn't matter into whom we bumped on the side-walks, or to whom we spoke in the saloons, the stores, the offices; all mentioned them as if they were personal belongings.

There had been a huge camp a few miles away, and a vast war plant equally near in another direction. There were more stores in the town, more negroes, a wider variety of American accents, a wider range of colourings and statures on the streets; more jewellers had set up shop; Dave's circulation had increased, though the size of his paper had been drastically curtailed; and the movie was now a daily affair. A lot of commercial, and some private, building was in progress on the outskirts of town: garages, warehouses, one-bay workshops and so on. The farmers round the banks and the town hall and in the taverns were more prosperous-looking—and more harassed and tired-looking, too. Their wives were far better dressed, so were their children in the backs of the saloon cars, which, though

By courtesy of U.S.I.S.



still much used, were of more expensive make than before.

The bank manager, Dave, Pete and I routed out our friend the librarian, a second-generation Hungarian-American who could still sing the old *Cigány* gipsy-songs brought from near Szeged by her aged parents. There, in a beautiful wood-frame house covered in vines, we sat in two rooms opening off each other, making a drawing-room as *gemütlich* as any you could find before the war anywhere between Vienna and, say, Belgrade; miniatures on the walls in family clusters; lace curtains; an old grand piano; and comfortable Victorian-looking furniture. With the old Hungarians, whose American speech still proclaimed its Central European origin, we had Viennese coffee and coffee-cake, and talked of what had been, here and in Europe, and what was yet to come.

Hank Schultz, the bank manager, seemed as anxiously puzzled as Dave about the changing face of his home town; about the future before the returning 'veterans'—veterans whose average age was about 23 to 25!

"This town, whether you call it Midwest or Great Plains, wasn't really isolationist in 1914-1918, and it wasn't in 1939-41 either," said Hank. "It was just a plain, God-fearing, honest, hard-working farmers' and storekeepers' community. It only wanted to be left alone, and it left other people alone. It never meddled, and it raised Hell whenever it was meddled with—like it did when the New Deal came in. But gee! compared with the New Deal, and the Supreme Court row, this war's an earthquake. I just can't figure out how we can go on in the way we've been going on. The farmers have paid off every mortgage our bank ever held. Everyone's got a full wad of bills. Everyone wants clothes and refrigerators and vacuum-cleaners and washing-machines and new cars and new homes and what-all. I can see it'll take some years—perhaps not many—to work off all this backlog of demand. But what when it's worked off? What when the world ain't hungry any more and the crops start piling up them surpluses again? What when we get more federal crop-regulation, and subsidies for not raising things? It beats me."

"Yeah," said Dave; "and what when farming's much more mechanized than it is even now, and *more* farm kids go to town? What'n Hell're they all gonna *be*; that's what I wanna know; and meantime what'n Hell's gonna become of towns like this here?"

He pulled at his pipe and looked musingly through the sunlit lace curtains and the trumpet-vines, and went on:

"American farming, like this round here, made America's inland towns; but not the big cities. Now, for years, the farm kids have been goin' to town, mainly to the cities. And they'll go more yet, most likely. But if farming declines relative to all the rest, it's the towns and cities as'll have to pay the taxes and the subsidies; and the Midwest and Great Plains farmers won't ever just become pensioners. Or will they?"

Pete thought it was all too big a problem even for the huge United States to solve on its own. Hank agreed. And then Dave said:

"Even you, Pete, from Chicawgo, 'd be surprised at what folks are sayin' now in this town. They talk a lot to me. They're fingerin' now as this war—yeah, *and* the one before that—didn't happen just casual-like. They reck'n as how they're caught up in things, like: big things; *mighty* big things. . . ." His voice trailed off.

It was Elizabeth, the librarian daughter of the house, who had the last word.

"You old sourpusses," she railed with an infectious laugh, "Mother and Dad here up and quit Hungary nearly fifty years ago. I was born here. We didn't have much of a town in those days. But only about one in every five of the kids at school with me could speak English—and it was all they had to speak among themselves, at that, and they had to learn it as they went along. But we've had few shenanigans in this town, really. We've gotten along together, Poles and Germans and Czechs and Hungarians and Italians and what-have-you. And our children in the school now are just plain Americans. We'll have troubles ahead, I guess, just as the first settlers did out this way. But *you* make yourselves out to be too important. Give the world time. It'll have to learn, perhaps the hard way, to get on as a community. Either that, or——" and she made an expressive little gesture that was more Hungarian than American.

Now when I read in my English papers of isolationism in America and "the Midwestern attitude" in world affairs my mind travels back out there, to South Dakota, and to Elizabeth, Hank, Dave and the rest of them.

And they don't seem so very far away, in space or in attitude, from Englishmen in the world's biggest city or in tiny villages that were there before Dakota had a name; or, I suppose, from Australians, South Africans and New Zealanders. In discovering how to annihilate itself, humanity has at any rate made isolation and insulation impossible. From such a perilous beginning, it might now take the path of wisdom, by which cometh understanding.

Farming in France

by P. LAMARTINE YATES

In France they order many matters differently from ourselves: some, it has been said, better. At a time when our own agriculture means more than usual to most of us, we may benefit by looking at our neighbours'. Mr Yates, whose book Food Production in Western Europe contains much relevant information, gives us herein a broad general view that may stimulate his readers to further inquiry

At the present moment the place of agriculture in the life of France is being vigorously discussed. During the war and after, the French people have faced an acute food problem which has shown up many weaknesses in their farming system. Therefore they are now formulating a plan for agriculture as part of a general plan of economic reconstruction. Just now they are also engaged with Britain, the United States and other nations in trade conversations where they must decide in what measure the economic protection of their farmers should be continued. What then are the characteristic features of French farming and what are its prospects for the future?

A distinguished French scientist once said to me: "We have made two great contribu-

tions to the civilization of Western Europe, our literature and our peasants." Without doubt the French are proud of their rural life. It ranks next to Paris in importance. Whereas Belgium, Holland and Britain have, in French eyes at least, sacrificed farming to industrial development and have concentrated population in large centres of manufacture, the French population is dispersed in hamlets, villages and small market towns dependent upon farmers for their life and trade. "And", continued my scientist friend, "our farming became democratic at the time of the Revolution, a multitude of small independent cultivators, while you English have large-scale farmers paying tribute to landlords. Our political democracy is rooted in our agricultural democracy. Do you

wonder that it provides the theme for so many of our political speeches? More than that, the farming community has always provided the armies for the defence of the nation." "How can that still be so," I asked, "when you now have only a third of your working population engaged in agriculture?" "Simply this," he replied; "you take the workers away from a steel-works and work stops; take them off the farms and the women carry on. The women have done the bulk of the farm work in this last war, in the first World War, and in the Franco-Prussian War." I remembered how in Britain we actually had to prevent farm workers from joining the Forces.

Farming is also important to France because it delivers over 90 per cent of the country's food supply compared with 30 per cent before 1939 in Britain. France's



Stanford, London



Photo Papillon

Farm-houses in Normandy are solidly built, but often dark and overcrowded. Electricity and telephones are quite common in farms in this region, though water and sanitation are usually lacking

population did not increase rapidly in the 19th century, and with a much lower population-density per square mile than England it has been easier to remain almost self-sufficient in food. Even so, it has required a complex structure of import duties and latterly quotas to keep out cheap foreign food. Agricultural protection was never a party issue in France as it has been in England; all political groups were agreed upon its necessity—to ensure the food supply in the event of war, and to keep a large population on the land. Farming still has a dominant influence on internal and external affairs, though the changed conditions of an 'atomic' age may entail substantial revisions of agricultural policy.

In France one finds a greater variety of climate and altitude than in any other country of Western Europe. By drawing a line south-westwards from Strasbourg to Bayonne you can divide France into two geographically contrasted triangles, the north-western a lowland country mostly below the 600-foot contour and well suited to agriculture, the south-eastern a mountainous

country with much rough hill pasture and stony wastes and some extremely fertile valleys. In the north-western zone the climate resembles that of south-eastern England—mild winters and summers, and an annual rainfall of 24 to 30 inches. The south-eastern zone has greater extremes: several months of snow on the mountains where the rainfall ranges between 50 and 65 inches, and a really warm summer in the valleys (July temperature averages well over 70° Fahrenheit at Avignon and Montpellier) which permits the growing of vines, tobacco and maize.

At this point the possibilities of generalization come to an end. I asked one Picardy farmer how many distinct farming regions he would distinguish in France. His wife answered for him, pointing to a large patchwork quilt. "How many coloured pieces are there on that quilt?" "I don't know. I should want to count." "Yes," she said, "and you would have to travel every secondary road in France, noting carefully as you went, before you could know fully the variety of our countryside." It is true: every thirty



Keystone

Normandy suffered most when the Allies, from June to August 1944, battled their way towards Paris. The course of fighting was marked by a trail of wrecked houses, ravaged farm-lands and dead cattle

miles brings a new environment, a different geology and climate to which farming practices have been closely adapted. Small wonder the French do not desire to take holidays abroad.

One can take a look at a selected few of these regions by making a quick motor tour round France. Suppose that you enter at Calais and drive first down to Soissons. You come into the heart of the most highly farmed land of France, a region which in many ways resembles East Anglia. Large farms run by substantial tenant farmers, almost all the land under the plough, wheat and sugar-beet the staple crops, cattle (from Normandy or the Charolais) fattened in yards, liberal use of dung and chemical fertilizers; but less mechanization than in East Anglia because in peace-time the field work was done by ill-paid, ill-housed Polish labour. There were whole villages of Poles in which it was said that French was not taught in school till the children were old enough to learn a foreign language. Today that labour has gone—swept away by the Germans into their own fields and factories—and since tractors are

scarce the land is far from fully cultivated. Physical damage is slight because the German retreat was rapid here, but the fields show the great shortage of fertilizers which still persists; there is not enough coal to run all the sugar-beet factories and the absence of the usual oilcake imports makes fattening a difficult proposition. Yet the French Government have been glad of this district; they found that it is easier to collect agricultural produce from large farms than from small ones.

Driving west into Normandy one crosses chalk uplands with flocks of Southdown sheep reminiscent of Hampshire and then enters the vales of lush pastures and fat Norman cows, cider-apple orchards and beehives—much akin to Dorset and Devon. There is a French saying that in Normandy you find the richest land and the laziest farmers. Even the Germans could not prevent the Normandy farm worker hiding his cider all the week effectively enough (from the Germans) but regularly getting drunk on it Saturday afternoons. Grass grows easily and richly for nine months in the year and there seems little point in ploughing. Dairying is taken seri-

ously and cattle-breeding societies and herd books are more widespread than in any other part of France. Some milk is sent to Paris but not enough because Parisians prefer wine: most of the milk is made into butter and cheese on the farms. Normandy butter, exported to England prior to 1914, is still reckoned the second best butter in France. Gervais and Camembert are the best-known cheeses. There has been much destruction here in the villages and small towns and cattle numbers are reduced.

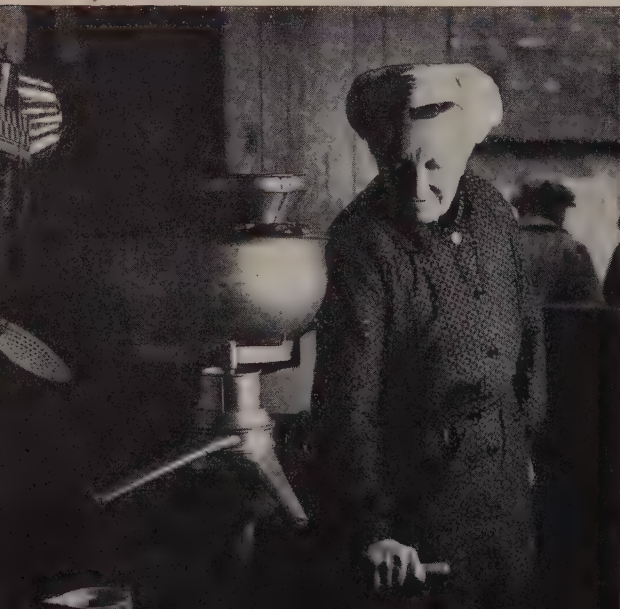
Pass south-west into Brittany, that mournful province of the Celtic twilight. It is said that when the Celts made their last stand and surrendered to the invading Franks, the druids put a curse upon the region that its crops should be blighted and its people the poorest in all France. Grain crops, it is true, do not prosper but Brittany grows wonderful potatoes, providing all the earlies for the Paris market. She has expert market gardeners and before the war Roscoff cauliflowers sold well on English markets. Yet her people are indeed poor and culturally backward, more so than any other agricultural group in France. I asked one woman why Breton mothers have so many children. She said, "On stony ground you sow much seed." Housing is primitive for man and beast. The stone houses are dark and damp inside; in some districts you may find the furniture held up off the floor on brackets screwed into the wall, since furniture rots if its feet rest on the damp floor. As one

writer, M. Lucas, aptly put it: "The peasant cares more to save his furniture than to save himself from the rheumatism which harasses his old age".

Drive on southward across the Loire through the Sologne, a sandy waste, and into rich Poitou. No longer stone and thatch but cob walls and red-tiled roofs, pitched much less steeply than in England because snow is almost unknown. In Poitou every house of more than one story and painted within the last fifteen years is called a 'château'. The land is divided into innumerable strips; it is nothing uncommon for a peasant cultivating 20 acres to have it in 50 separate pieces of land scattered all over the commune, some of them three or four miles from his homestead. This subdivision, which is found throughout most of France, results from the equal division of the inheritance among all the children, each of whom insists on getting a piece of the heavy land, a piece of the light, a share of the meadow and a share of the vineyard. Subdivision is a curse: it prevents the application of modern farming practices and it keeps costs high. In France wheat costs nearly twice as much to produce on a field of two-fifths of an acre as on a field of three acres. I saw an old man ploughing a strip of quite heavy land with a donkey and inquired his circumstances. He could not afford a horse but found the donkey a surprisingly good substitute on road and field though he himself must help pull when the land was wet. I asked his holdings and

Inside a Normandy farm the farmer's wife is making butter. She wears a white cap, but white coats are seldom seen either in dairies or in the milking sheds. Modern dairy machinery is also rare. Contented-looking black and white cows of Norman breed provide excellent beef as well as milk

Photo Papillon



Paul Popper



earnings: he had seven acres from which he sold about £30 worth of produce and picked up £10 to £20 a year by acting as carrier for others in the village. In addition he produced most of his food except milk (he lacked a cow) and so was better off than hired labourers in that region who got in 1938 only 15s. weekly besides their board and lodging.

Moving further south we drive into the Charentes region with what is in many ways the outstanding dairying of France. Here and only here has cooperation developed in a large way. Elsewhere can be found numerous cooperatives for credit, cattle insurance, cheese and wine making and flour milling, but these only cover a single village or mill. In the Charentes region there has been for many years a group of dairy cooperatives with some 80,000 farmer members, 270,000 cows and producing 20,000 tons of butter per annum. There are close resemblances to Denmark. Just as the Danes saw their grain export trade ruined by overseas wheat in the 1870's and 80's, and turned to milk and pigs, so the farmers of the Charentes had their vines, their staple enterprise, destroyed by phylloxera, and in spite of the lack of water and good pasture in their district they built up an arable-dairying system based on lucerne. Not that the standards of cleanliness and hygiene can compare with Denmark; furthermore, few of the dairies pay for milk on the basis of butter-fat content, so the farmers have little inducement to improve the quality of their milk. Milk-recording is a rarity. Nevertheless the farmers have attained standards of technical efficiency and of organization not seen in other regions. The war has affected the Charentes much less than Normandy. Not only has there been no physical damage but there is less dependence on oilcake and other bought-in feeding stuffs; cow numbers and milk production have been better maintained. Paris may not see so much of the butter as formerly, but there is plenty locally for friends and guests.



Photo Papillon

In their Sunday best, holding the long, pointed sticks with which they guide their oxen, peasants from the Limousin region air their views on politics just as eloquently as on farming

Passing on through the Cognac country, a sharp eye might detect in certain inconspicuous back gardens some peculiar holes recently dug and only partially filled in. Here it was that some of the world's finest brandy was hidden successfully from the Germans; it has now been sent to Paris for the Quai d'Orsay banquets and also for the black market.

Down in the Bordeaux country the famous vineyards have suffered cruelly during the war from lack of copper sulphate and the other sprays necessary to keep the many pests at bay. Yields have been reduced to two-



A large farm-house near Rambouillet. In its architecture it has some pretension towards being a small 'château'. The conical building on the right is a massive silo for storing fodder in its green, compressed state

Photo Jahan

thirds, in some cases to half, of normal and the quality of some has been temporarily impaired. The Bordeaux wines of international repute are mostly produced on what for vineyards are somewhat large properties—'châteaux' of 50 or 60 acres, requiring a considerable force of hired labour and a substantial investment of capital. The finest vineyards situated on small elevations or gentle slopes fetched £200 to £500 per acre even before the war. I am told that the 1945 vintage though small in volume may prove to have been of remarkable quality.

The vast vineyards of the Mediterranean plain which produce the *vin ordinaire* for the cafés of France have equally suffered and will not meet the public need again for two or three seasons. This seems an odd predicament when less than ten years ago wine was in surplus and was being turned into fuel for

motor cars. (Motor fuel was also being made out of surplus sugar-beet and cider apples.) If anyone needs reminding of the economic follies of the inter-war years, let him reflect that the cost of running a car ten miles on fuel made from grapes exceeded the cost of carrying four persons in rickshaws over the same distance. The French had another peculiar remedy for over-production in the 1930's; they arranged to keep their high-cost producers of wine in business (and the same was true of wheat growers) by paying them higher prices than low-cost producers. Today the emphasis is no longer on providing employment at the expense of national income but on increasing national income and incidentally maintaining full employment. This will lead to quite a different agricultural policy.

Volatile and turbulent are the peasants of

le Midi, quick to joy, sudden to anger, passionate royalist or ardent communist, convinced cooperators or determined individualists. Not a few are Spaniards and Italians who moved in between the wars (as many illegally as legally) and took small farms on a share-cropping basis. The people are as sunny as the seasons and every landscape might be a painting by Van Gogh. Yet, not so far north in the Causses, and in the Massif Central, the contrast of temperament is complete. Dour and taciturn, slow in speech and action, cautious in commerce and in friendship, these peasants of the bleak unfriendly mountains, whence they reap a meagre livelihood raising store sheep and cattle, nevertheless exhibit courage and endurance unique in France. In peacetime they export sturdy sons who take farms in gentler districts; during the German occupation they contributed many to the Resistance movement.

We must drive further. We cannot pause

among the olive groves of the Maritime Alps where formerly acres and acres of roses were grown for a perfume industry wellnigh killed by the synthetics which have outdone nature in variety and intensity of fragrance. We cannot pause to visit the market gardeners of Vaucluse whose skills are among the foremost in Europe and who have been hard hit since the liberation by shortage of rail transport for getting their early produce to the Paris market.

But a visit must be paid to the Savoy Alps to examine a system of dairy farming particularly adapted to its special environment. In the lower valleys are the farms—small to medium in acreage, growing mainly hay but some oats as winter fodder. The cows are kept stalled eight months of the year; then in June they are driven to the upper valleys and alps where they remain in charge of communal cowherds and cheese-makers till late September. Once, returning to a mountain camp from a sudden visit to a dentist near

Photo Papillon

The assembled traction-power of a wealthy farmer in the Brie district: a diminutive caterpillar tractor contrasts with the cumbersome farm-carts drawn (as in other prosperous farming regions) by horses as well as oxen





Photo Papillon

Cattle of the Tarentaise breed are found on the rich Alpine pastures of Dauphiné. Each of the animals has a bell of a different note so that the herdsmaid can trace them if they should stray

Pralognan, I was overtaken by nightfall miles from any hamlet and was glad to catch sight of a glimmer of light from one of these *fruiteries*, as they are called. To my knocking a heavy wooden door was unlatched, revealing a bearded man in long cotton nightshirt holding a candle and looking as surprised as I. He welcomed me to a bed of straw and sacks in a corner and returned to the large wooden crib in which his companions lay. Soon their mutterings gave place to snores, and snores to silence until one could hear the tearing of grass outside by a few late cows. In the morning there emerged four men and a boy. We breakfasted on sour bread, milk and cheese. Then while the others went herding I watched the cheese-maker swing his enormous copper cauldron of milk over the slow fire, add starter, stir, cool, re-heat, break curds with long wire fork, slip the muslin down, lift out the drip-

ping mass, place in the waiting wooden mould and load with rocks. This group of men, he told me, spend four summer months in this hut, provisions being sent up on mules from the valley. They are appointed and paid by the village commune which collects contributions from the peasants in proportion to the cows they send up. The proceeds from the sales of cheese are shared out among the peasants at the end of the season. There are many variants, he explained; in some valleys each peasant of substance sends a son or relative as herdsman; in others there may be several individual cheese-huts rather than one communal one. In some cases only the cheese-maker is communally employed. Everywhere a certain quantity of summer grazing rights attaches to each farm in the valley; the farmer can graze extra cattle for a fee, but only to a certain limit. No one can use

money to take so much grazing that the poorer peasants might go short. Some of the finest Gruyère cheese comes from these primitive huts, also St Marcellin and many less well-known cheeses.

A similar kind of cooperation takes place in most of the vine-growing districts. Many of the small cultivators are members of co-operative wineries which by making a better quality product can get more for the wine than the peasant who makes his own and sells through dealers. Cooperatives are found in the Gironde, in Hérault, in the Beaujolais country and in Burgundy whither we now turn. Generally they are concerned in making ordinary table wines, but near Nuits St Georges you may see the Clos Veugeot where a large vineyard of many acres enclosed within a single wall is owned and operated by numerous independent families whose grapes are pooled to make the world-famous product. Before the war many of the Burgundy vineyard workers and also many share-croppers in this region came from Czechoslovakia. Now they are gone and

there is acute labour shortage.

Above the Côte d'Or and north of Dijon in the plain of Burgundy the vines give place to ordinary farm crops. Here is poorer soil, harsher climate and more woodland. Here persists the quaint Burgundian custom of ploughing heavy land with four horses strung out in a single line. No one has explained to me either the origin or the usefulness of this procedure. Generally two out of the four horses manage to slack on the job. We cannot visit the deserted sheep farms of the Morvan, the cheese-making of the Vosges, the vineyards of Moselle, the potato farms of Lorraine, nor the Champagne country, nor finally, on the return to Paris, the sugar factories of the Ile de France, nor see the making of Brie cheese. And there are other regions—another year another tour!

The war has changed little in the fundamental structure of French farming. The dominant impression is still of smallness—smallness of geographical regions, small size of farm, of field-strip, of equipment; also the smallness of the farmer's family and of his

In the Maurienne Valley many peasants have not enough land for grazing or the money to buy a horse. Thus they ride to the fields or to market on their cow, a slow but adequate form of transport

Photo Jahan





Photo Jahan

One of the many vineyards that flourish in the chalky soil of the broad plains of Champagne. The produce is mainly for export, as are all France's best wines. Frenchmen are now rationed to two bottles of wine per week.

income. True, there are fairly large farms in the north and around Paris but these are exceptions. Neither has the traditional conservatism changed—I mean in farming, not in politics. In all countries most farmers are naturally resistant to innovation but the French especially so. For a hundred years the population has increased so little that there has been no call for new farm-houses and new farm-buildings. Economically the old structure of wheat and meat has been retained by protection—no switch as we had in Britain to milk and fodder crops—and with that structure the old farming practices have been retained too. Neither do I consider that the intense individualism has been much modified. During the war the farmer resisted regimentation into a single all-embracing Farmers' Union; he resisted the compulsory collection of his produce. He accepts a nation-wide cooperative marketing organization where clearly advantageous, as in the case of wheat; but he chooses small autonomous cooperatives for wine, butter and cheese-making and too often prefers to do the processing and marketing for himself, however disadvantageous it may prove.

The war has nevertheless upset agriculture substantially. First, the loss of man-power—in killed, in prisoners, and in migration to urban occupations. Add to this the loss of horses and draught oxen and one understands the emphasis being laid today on tractors and other forms of mechanization. It is not a fad but a necessity. Next, the almost complete absence of fertilizers and pesticides has seriously cut down the yields of field crops and vines where these aids were normally used; as a result the value of fertilizers and pest control is going to be much more widely appreciated than before, and their use will increase as soon as supplies are available again. Another significant experience has been the upset in agricultural prices and the ubiquity of black markets in food. This has convinced a large section of public opinion that government should in peacetime exercise more control over marketing arrangements and price policy. Everyone longs for the day when rationing can be abolished, but equally they want a permanent and positive food policy for the nation.

That cannot be outlined in detail yet for at present the day-to-day supply situation remains critical. The 1946 harvest has been well below normal; the acreage was well below pre-war because of labour shortage and unattractive prices, although yields were up to average for most crops (in spite of continued fertilizer shortage). The govern-

ment may still have to import a small quantity of wheat and the rations of meat and fats will remain low. The intermediate policy, as one Frenchman put it to me, "must be to assure sufficient home production of basic foods—bread, potatoes and wine—and not to use much foreign exchange for imports of meat, sugar and fats but rather to restrict consumption of these until production at home and in the colonies recovers. We must continue austerity now if we are to afford a better table later on."

The long-term policy includes a large programme for modernizing agriculture. A plan is being drawn up for large investment in new farm-houses and buildings, rural roads and water supplies, electricity and farm machinery, better livestock and better marketing facilities. One experienced leader of French farmers told me recently that, by confining grain-growing to a reduced area and to the better land and by liberal use of fertilizer, the costs of wheat could be made competitive with Canada and Australia. "France", he said, "will without much protection be self-sufficient in all foods except fats; she will import oilseeds mainly from her colonies for fats and for oilcake. She will try to develop a much larger export of her specialities—of wines, cheeses, crystallized fruits, *foie gras* and so on. To the extent that these exports expand she might later consider reducing somewhat her sugar production and buying some from abroad." She will have a larger food output than at present on a smaller acreage and with fewer hands in agriculture. Most Frenchmen are now convinced that peasants' incomes can be permanently increased, not just by raising agricultural prices but by increasing output per man, which is still disappointingly low.

An essential element in farming prosperity will also be the development of a nutrition policy, such as FAO (Food and Agriculture Organization of the United Nations) is working out in consultation with governments. By stimulating through school meals and special distribution schemes a brisk demand for milk, eggs, fruits and vegetables, the home market can be turned gradually toward these foods which bring French farmers the greatest profit. The future is full of hope. There is immense scope for modernization whilst retaining the variety and quality which are the hallmark of French foodstuffs. The call is for an agricultural policy which can show farmers the road to greater prosperity whilst preserving the freedom which each Frenchman so dearly prizes, of attaining the goal after his own fashion.

Banana Indians

Notes and Photographs by T. L. BLAU

When the Spaniards first touched North-West Colombia in 1501, they came upon a warlike tribe in the forested coastal area: the Choco Indians, a tribe which lived communally, wore little or no clothing and was expert in the arts of canoing, the poisoned arrow and the blowgun. It was from these people that Andagoya in 1552 first heard rumours of the fabulous empire of the Incas to the south. Today the Chocos are much reduced in numbers and have taken to peaceful banana-harvesting for their livelihood, their former wild existence being modified with the advent of missionaries and railways and the recent working of platinum mines in the Choco district





Despite such influences, this primitive, seemingly half-finished, erection represents a present-day Choco Indian's home: the kind he built four centuries ago, unless he lived in a tree. Such pile dwellings are rarely found in South America



A notched log serves as ladder to the twelve-foot-high living room. Here the only protection against the elements is a sun-shade roof made from palm leaves. The men are physically perfect—agile, strong and healthy—and the tribe as clean as any who live near the Equator, despite their crowded living quarters



Clusters of wild green bananas are hacked down in the jungle with a two-foot-long matchet and piled onto the native canoes or piraguas, hollowed out of solid mahogany. To prevent premature ripening, the long leaves of the banana tree are used as a covering



The boats are then skilfully paddled down the Atrato River and the bananas loaded onto steamers bound for northern markets, where the fruit is bought up by large companies. The prostrate wild boar was shot by the Indians with bow and arrow and weighed about 350 lbs.



The quayside of Turbo, a port near the mouth of the Atrato, is just one mass of bananas and bustling Indians in the scorching sun. The men wear very little; the women a wrap-around and plenty of lipstick, their great passion. As for the bananas, they are off on the 200-mile trip to Panama; but how many will reach England?

London's River Police

by P. H. FEARNLEY

Mr Fearnley, who has been Public Information Officer at New Scotland Yard since the post was created in December 1945, has a particular knowledge of all divisions of the Metropolitan Police Force. The accompanying notes and photographs indicate some of the work done by the "Thames" Division

How many people are aware of the existence of "Thames" Division, a highly efficient section of the 23 divisions of the Metropolitan Police, responsible for 36 miles of the river? The Division has a long, eventful history, being the first police force formed in Great Britain, to be taken later as a model for London's Metropolitan Police. It was the West India Company of Merchantmen who first conceived the idea of forming their own band of men to try to check the incredible amount of looting of their cargoes that went on whenever a ship entered the Thames. Open piracy was such that sometimes a merchantman was lucky if he got 50 per cent of his goods safely stored on land. This Marine Police force was formed in 1798 with headquarters at Wapping, and at once proved successful. These early policemen were recruited from the seaman and waterman classes and proved to be tougher and more astute than the gangs of ruffians who ravaged the Thames. Row-boats were their only transport, but the police could use their cutlasses and fists to great effect if a situation got out of hand. Eventually the gangs were broken up, many being transported. By 1839 this old Marine Police was incorporated in the Metropolitan Police Force as the "Thames" Division.

Headquarters are still at Wapping, though they are now in a pleasant stone building. Originally the police stations were hulks; the only floating station still remaining is at Waterloo Pier. Here, because of the low parapet of Waterloo Bridge, the highest percentage of would-be suicides is dealt with. No one has a chance for long in the cold, powerful currents of the Thames, and it is impossible to swim against the tide. Immediately the alarm is given, a launch—always equipped with drags, buoyant cushions, salvage gear and first-aid equipment—shoots off, manned by a crew of three. The unfortunate person is hauled out, carbon dioxide is pumped into him, and, back at Waterloo Pier, he is stripped and plunged into a hot bath to restore circulation. A woman is put into the bath clothed, so as to waste no time until another woman can be found to attend. No efforts can prevent suicides altogether and the death-rate from this cause is two a week: they are beyond hot baths. Collisions in fog or storms occasionally occur but, fortunately, it rarely happens that one of the crew goes overboard in

"Thames" Division. Navigating with practically no lights during the blackout years was also fraught with danger; the war was very real on the River Thames. Men volunteering for the "Thames" Division must be able to swim and pass an examination in the management of boats, navigation, etc.; they have also to serve in the land forces of the Metropolitan Police.

The team-spirit engendered in the Division by this background of special experience is reinforced by the need for every man to know how to do everyone else's job and for all to work together in any emergency. The discipline shows a combination of strictness and intimacy resembling that of the Royal Navy.

The routine work of the River Police is much the same as a policeman's beat on land with obvious modifications. Instead of trying shop doors, they dodge around wharves, watch for smugglers and people loitering near the docks, rescue men stranded on mud-banks, intervene in rowdy disputes between foreign seamen, recover and secure drifting barges, etc. Every year about 10,000 barges pass up and down the Thames, each carrying a cargo of 150-300 tons of something in short supply—tea, sugar, meat, rubber, cloth, etc. With such tempting loot constantly berthed alongside wharves, a foggy night may induce a gang employed by black marketeers to attempt a raid. But the river is a hazardous enemy and the police with their roving search-lights hardly give them time. In point of fact, crime is practically non-existent on the Thames.

It is often bitterly cold work, too. In thick, blue, woollen coats, the men are out all the time during the eight-hour shift, except for a half-hour break for a meal. The most effective speed for working the beat in these 30-foot Diesel-engined launches, powered with an 80-h.p. engine, is about 6-7 knots, but this can be increased in a chase to 15 knots or more. Speeding is normally restricted, as the swell caused can easily throw a harmless bargee (a 'Charley' in Thames language) off his boat into the river. Despite the toughness of their life, however, the men of the Division seem strangely attached to this bleak, watery world of blackened barges, cargo ships, seagulls and driftwood, bounded on its winding muddy banks by tall old warehouses and swinging cranes—London's parent river, the Thames.



British Council photographs by Harold White, F.I.B.P., F.R.P.S.

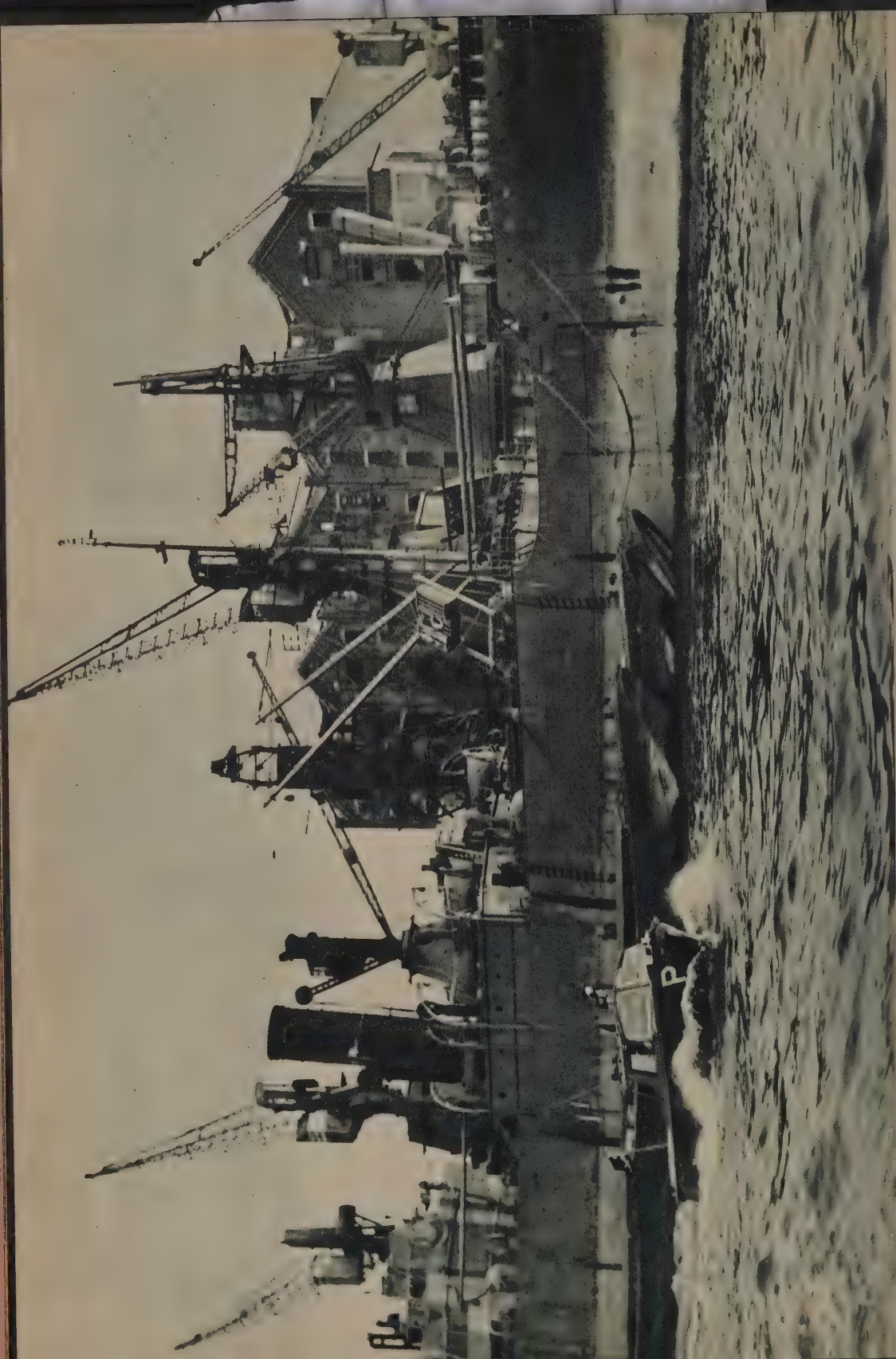
On its way to the docks, a River Police boat passes Tower Bridge, the last bridge across the Thames. The beat of the "Thames" Division extends along seventy-two miles of river bank and under twenty-four bridges from the green fields of Teddington, past the smoking factory chimneys and steep, grey warehouses of London's many industries, as far as Dartford Creek on the south shore and the River Beam, Essex, on the north shore



The thirty-six miles of river is patrolled day and night by forty-nine launches operating from five stations: Barnes, Waterloo, Wapping, Blackwall and Erith



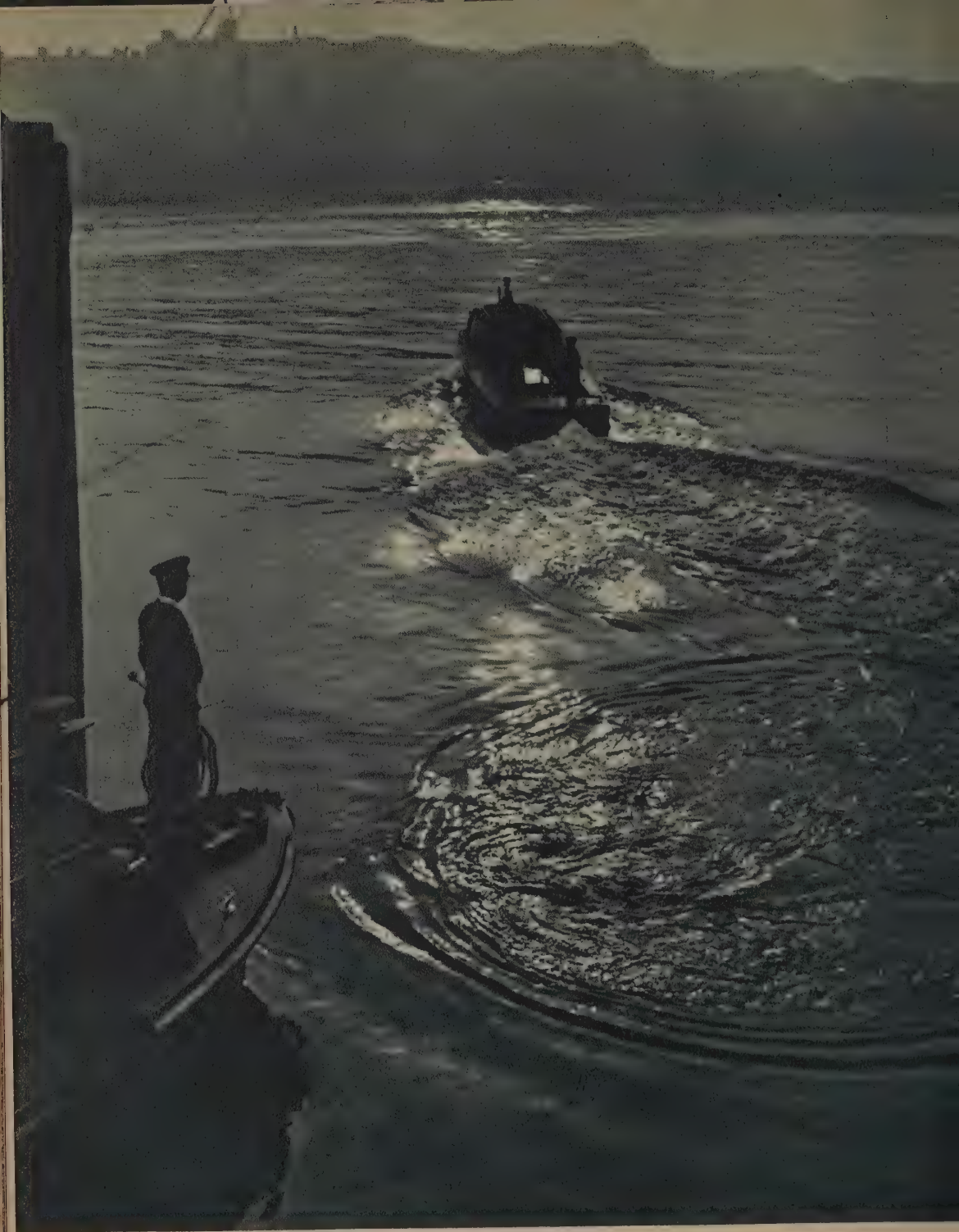
The end of a shift on a wet night. While London sleeps, vigilant launches are abroad, their powerful searchlights ranging over the dark waters of the Thames



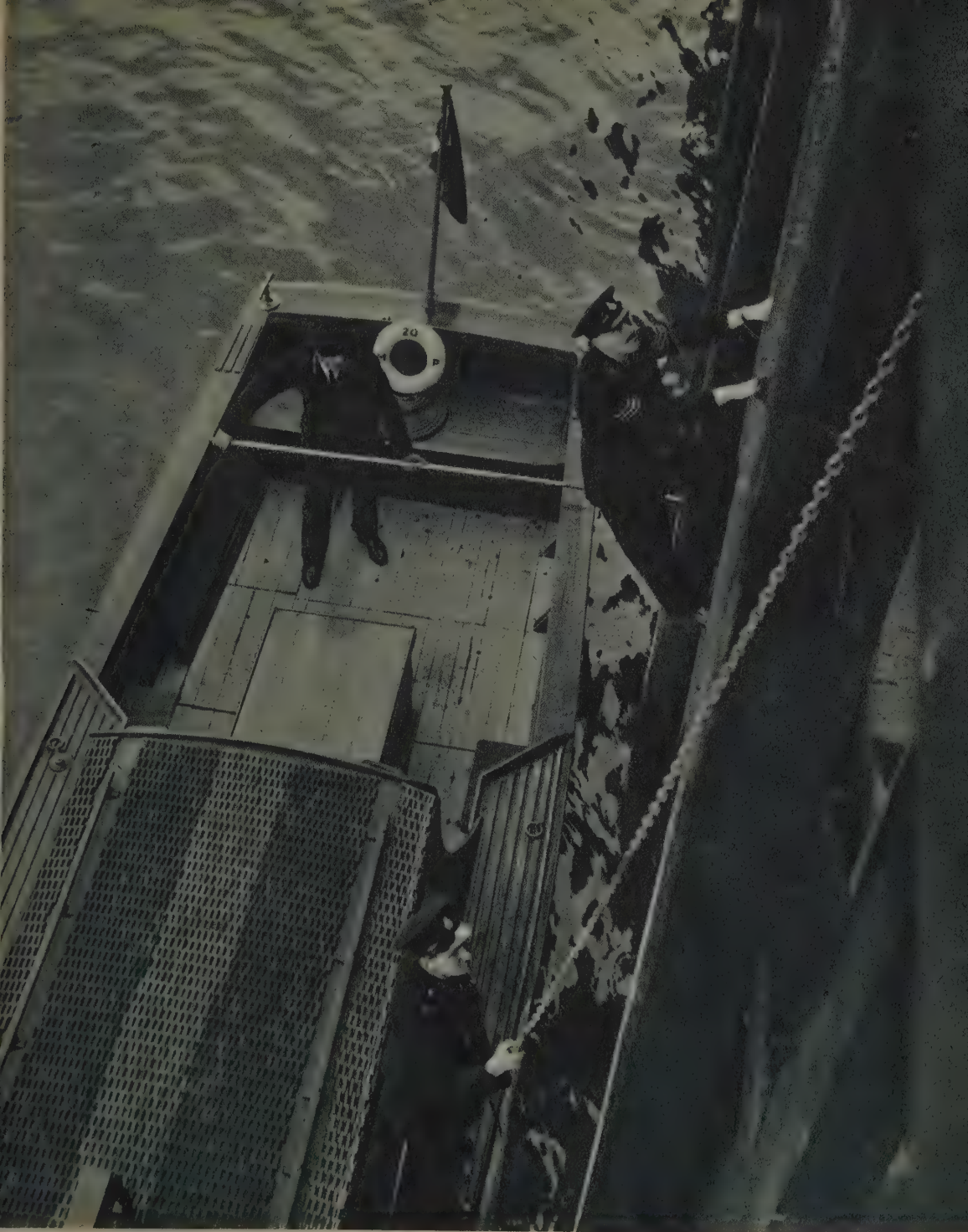
In the busy lower pool of the Port of London the River Police may have to catch runaway barges, deal with vessels in collision or fires on ships and wharves—



—while further inland, by the quieter, tree-shaded water near Battersea Park, their main job is to keep an eye on private craft and to secure the moorings



An urgent call for assistance has just been received at a River Police station. Within ten to fifteen minutes most places on the river can be reached by powerful launches equipped with wireless. The crews are well able to deal with 'incidents,' for they are tough men and good swimmers—drawn mainly from the Merchant Navy



"There's something wrong up there"—noting suspicious action on a wharf, the sergeant, who acts as coxswain in charge, clammers up the slimy posts to investigate, assisted by his crew of two constables. In the area they patrol, the efforts of "Thames" Division have kept the average down to nine crimes a month during the last year



Evening peace up-river . . . but someone's felonious little plans may be maturing and the policeman cannot relax

The Charming Pied Flycatcher

by A. F. PARK, F.R.P.S.

The relationship of living creatures to their environment may be regarded either as a geographical aspect of zoology or a zoological aspect of geography. Opportunities for studies in this field are open to almost anyone: 'what it takes' to avail oneself of them in the case of a friendly bird is shown by Mr Park, whose book Making Friends with Birds will be published by Chatto & Windus in 1947

WENDING my way homeward one sultry day in early June I had a momentary glimpse of a small bird movement in the tree tops ahead. Thunder was threatening, my tea was long overdue, I felt tired and overheated; nevertheless, I jumped off my bicycle to observe, knowing that many good things come from casual beginnings.

A few moments later I saw the bird again and identified it as a Flycatcher. Soon I had a closer view which revealed the subject as a hen Pied Flycatcher, with food in her beak. This was decidedly worth investigating so I unslung my heavy camera and settled down to watch.

On my left lay a small orchard, a grass-covered area somewhat under an acre in extent, containing a dozen gnarled apple trees in several of which there were holes. For the next few minutes the bird flitted among the trees, then flew towards the nearest one, just twenty feet from where I stood. I climbed over the wall and found the nest in a hole some five feet above the ground and fortunately not visible from the path.

Before describing my experiences with the owners of this nest I propose to make a few remarks about Flycatchers. In Britain we have two species of Flycatchers—the Spotted and the Pied. The former is found throughout the country but the distribution of the latter is an ornithological mystery. The Pied Flycatcher is limited to certain localities in Wales, Cumberland and the extreme north of England and is rarely observed throughout the greater part of the British Isles.

This erratic distribution has not yet been explained. Both species seem partial to the same kind of food though their manner of securing it is different. The same kind of district—well-wooded, hilly country—is favoured by both and the choice of nesting sites is similar—holes in trees and masonry—so the localization of the Pied is not due to the lack of nesting amenities.

My native county, Northumberland, is one of the favoured areas. In the Allendale district, 750 feet above sea-level and surrounded by moors, I found the subjects of this story, in

a wooded valley some two hundred yards from a small river near my home. Another pair nested two miles further down the valley a couple of years previously, in a depression at the end of a birch stump, vertical and open to the sky. The birds were tame but the place was too frequented for photography.

Apart from the question of distribution the species is noted for its inconsistency. For a number of years there may be several pairs in a district, then the species may not be seen again for a season or two. Once the brood leaves the nest the whole family has the habit of disappearing suddenly and completely. This delightful migrant is truly a bird of strange contradictions and extremes, so elusive and mysterious yet so friendly and confiding.

The name Flycatcher is very appropriate, though the food is not confined to flies. The diet consists of insects of various kinds, caught in the air with the agility afforded by powerful wings. The typical Flycatcher method of hunting is to perch on some stance such as a post or fence or a stump or branch at any height up to the tree tops, then dart at some passing insect and circle back to the starting point. Certain favoured stances are frequented day after day. The Pied Flycatcher often hunts at a lower level than the Spotted, even to the extent of foraging in the grass and picking insects and grubs from the herbage. The legend that rain portends when the Swallows fly low is based on truth; they fly low for the purpose of capturing the insects found there when bad weather threatens. Flycatchers do the same.

Let us return to the orchard. With the aid of a torch I found that the nest lay some nine inches from the entrance to the hole in the tree, at the end of a narrow passage. The chicks appeared to be about a week old—five or six of them as far as I could judge. I sat down by the wall, twenty feet from the spot; then the hen flew onto the tree, surveyed me for a few moments and entered the hole with food. Before she emerged the cock appeared and without hesitation flew down to the entrance, clung on the edge, then fed his



The cock Pied Flycatcher at the entrance to its nest, clinging on the edge of a knot of the tree with tail bent beneath to afford stability. When a perch was fixed at the entrance, for photographic purposes, both cock and hen used it extensively. The nest was only five feet above ground level, in a hollow apple tree



All photographs by the Author

family as soon as the hen came out.

I moved nearer when the birds had made a number of visits without showing any sign of concern. As this made no difference to their behaviour I advanced in short stages until in the space of twenty minutes these lovely birds were conducting their affairs, entirely at ease, as I sat but eight feet away. I then went home for my belated tea and pondered over the prospects of 'making friends' with them.

Here, indeed, was a splendid combination. I had found a lovely subject; the birds were friendly and responsive; the nest was in a low situation, permitting approach by degrees—it might have been twenty feet aloft, photographically inaccessible; the foliage was sparse, affording enough light for photography. Above all, I had just started my holidays and was free to give all my time to this subject. I therefore decided to do so though it meant the sacrifice of my plans concerning a Willow Warbler whose confidence I had gained. No particular qualms arose through this decision—I could find many other Willow Warblers but Pied Flycatchers were scarce.

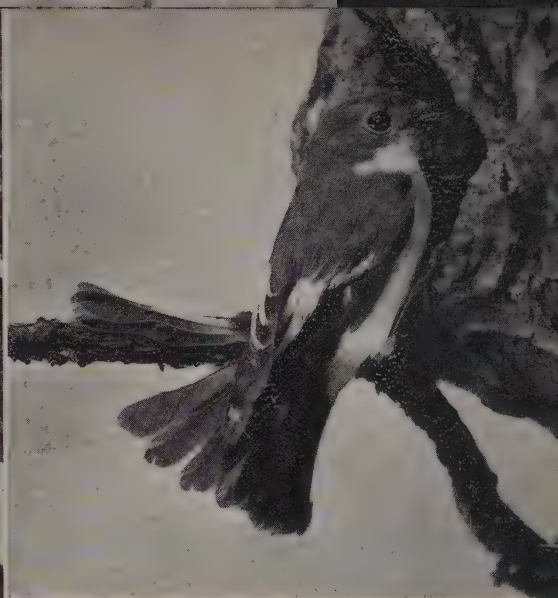
The following morning I went back to the orchard and introduced the camera and tripod. Progress was rapid and I was soon photographing the birds at the nest entrance, with the camera focused at three feet, and myself only eight feet away. Both birds were delightfully tame, in which respect there was nothing to choose between them. The cock

gave the impression of being the tamer because he was such a go-getter, so decisive and purposeful in action. The birds would often return together and I noticed that the cock was invariably the first to enter, while the hen clung to the rough bark near the nest until the way was clear.

Their procedure was very consistent at the nest. Each bird would cling on the lower edge of the knot with tail bent beneath and pressed against the tree, presumably to afford stability. Both attended to nest sanitation. They took equal shares in feeding the family, but one or the other would sometimes disappear for fifteen minutes or so, in order to feed while the partner carried on.

Several photographs were taken, each being largely a replica of the others, a similar position being assumed each time. In the hope of securing some variation in position I selected a thin, dead twig from the apple tree and fixed it at the nest entrance to form a small perch. The plan was an immediate success, the perch being apparently appreciated by the birds, who henceforth used it with very few exceptions. I photographed both birds together on the perch within five minutes of its erection. I also hoped that when the chicks became venturesome they might find the twig useful as a vantage point, but my holiday ended before they left the nest.

These aristocrats were a joy to observe, being so intent on their family affairs, so



The hen Pied Flycatcher had a habit of extending her wings in varying degrees and, on occasions, drooping them. She also indulged in frequent tail-fanning, either alighting with fanned tail or starting the fanning process after arrival. The cock was not addicted to either of these habits

charmingly tame and friendly. The cock was strikingly handsome, a study in black and white with a conspicuous splash of white on each black wing and another on his forehead. The hen was handsome too, with her warm brown plumage and pure white breast, though she lacked the white forehead and bold wing markings of her mate, her wings being barred with two white lines. The cock would often utter a series of staccato calls, similar to the notes of the Redstart or the Chats. I never heard the hen give this call or any other.

Two days later we were such good friends that there was no need for the string release. By then I was standing alongside the camera, now but two feet from the birds, and was using the bulb release. At this close range my $7\frac{1}{2}$ " lens produced images about $\frac{1}{4}$ th natural size. On this large scale the distant background of grass photographed as a light tone—an ideal setting for the birds on the partially shaded perch. The birds were vigorous and agile on the wing but momentarily quiescent upon alighting, so by seizing the critical moment I was able to give the relatively slow exposure of $\frac{1}{25}$ th second. Both birds ignored the impact of the shutter.

Owing to the unsettled weather there were days when camera work was impossible, but I watched my Flycatcher friends every day for a week. The hen had a habit of fanning her tail, which was probably an expression of some emotion which I failed to discern. She

would often alight with fanned tail and at other times would start the fanning process as she stood on the perch. This action had nothing to do with my proximity for I frequently saw it occur in the distance. Another of her habits was to extend her wings in varying degrees and, on occasions, drooping them. The cock was not addicted to either of these habits.

About five inches from the entrance, the passage narrowed considerably, then widened into a recess just large enough for the nest. As both birds made their exit head first there was evidently room to turn in the recess. When the youngsters reached a certain stage of development there was insufficient room for this turning movement on the part of the male, who resourcefully adopted the technique of backing out! The hen, being somewhat slimmer, was not obliged to resort to this course, even when the family was ready for departure.

In the case of the hen a single nest visit sufficed for both feeding and hygiene attention. The cock was equally attentive but his sturdy physique obstructed the light so that after feeding the chicks and backing out he had to survey the situation from the perch and re-enter if his services were needed. The hen too would occasionally survey from outside after leaving the nest, as though suspecting a call.

On one occasion when the hen was in the nest, the cock came to the perch without

In the case of a hen a single nest visit usually sufficed for both feeding and hygiene attention. On leaving the nest she would sometimes pause as if in anticipation of a call. Her mate is patiently waiting



The sturdy physique of the cock obstructed the light as he fed the chicks. His technique was to back out and survey the hygiene situation from outside, then re-enter if his services appeared to be needed



On another occasion while the hen was in the nest the cock came to the perch without food. He raised his head and uttered a low, indeterminate warbling call, which brought the hen hurriedly to the entrance





The Pied Flycatchers were tame and devoted, obviously happy in company. The hen kept her plumage dry through taking most of her food on the wing, but the cock's breast feathers were soaked through foraging in the wet grass. Both birds ignored the photographer standing only two feet away

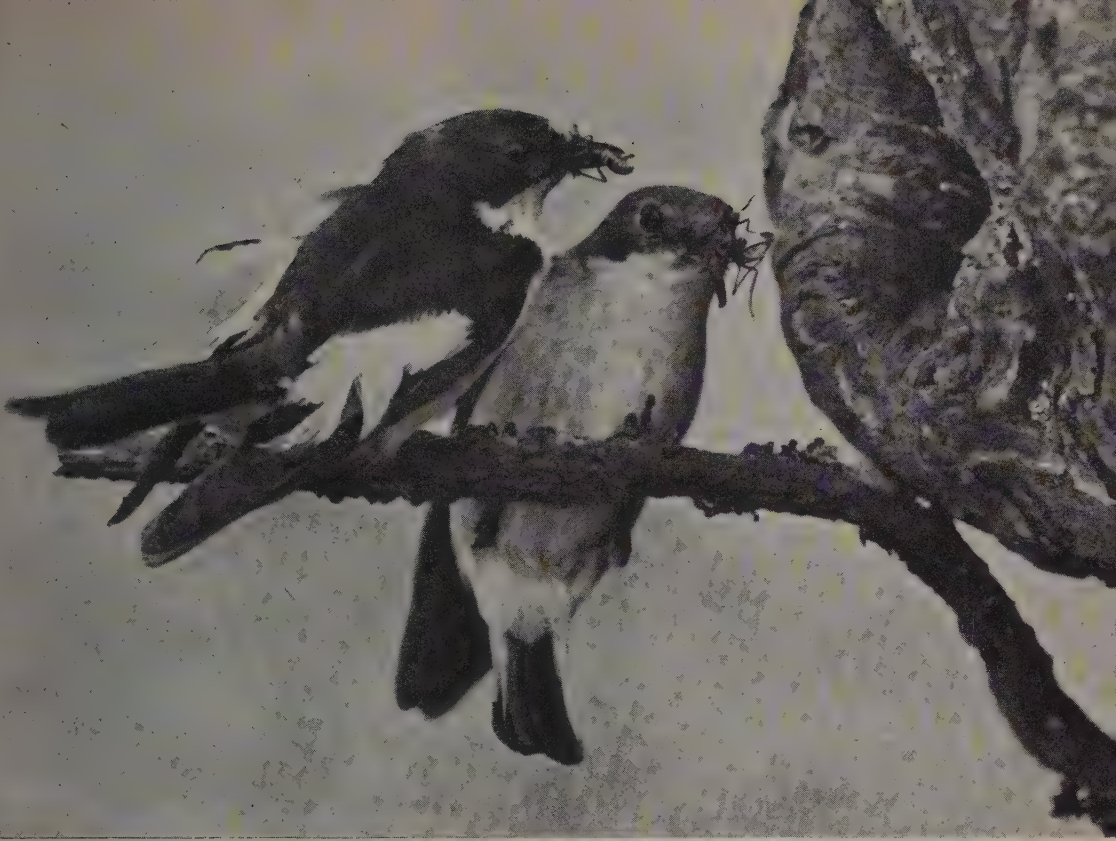
food. He raised his head and uttered a low, indeterminate warbling call, which brought the hen hurriedly to the entrance just as I released the shutter. The pair remained on the perch for some moments but nothing of consequence happened. Both birds then flew away for food. I have no idea what significance lay in this episode, which was an isolated occasion, though I heard this soft warble in the distance three or four times. It was quite distinct from the "chat-chat-chat" previously mentioned.

The more I saw of these lovely Flycatchers the more was I aware of their exceptional mutual devotion. The cock was particularly affectionate towards his mate. In many instances when she came to the perch with food he joined her before he had collected food himself, as though for the sheer joy of being in her company. When he came thus empty-handed he would wait on the perch until she had paid her nest visit, and then the pair would depart together. If such conduct on his part was not inspired by affection it was

assuredly not due to any protective instinct. Protection implies danger, but no danger or other need for protection was evident here, least of all in the form of my presence. Among birds I have never seen such harmony, co-operation and devotion as was evidenced by this pair.

Now that the youngsters were almost fully grown the food traffic was enormous. For the most part the parents arrived singly but sometimes they happened to arrive together. In order to promote these visits I would sometimes stand ahead of the camera, nearer to the nest, as soon as one of the birds approached; when the other appeared I would resume my place by the camera. I secured several dual pictures in this manner. In the end this procedure was futile, for the birds would come back to the nest—sometimes together—as I stood in front of the camera, little more than a foot from the perch. The birds had in fact become too tame for my purpose.

The hen captured most of her food on the wing and thus kept her plumage dry. The



This time the pair arrived together and the cock reached the perch first. There was insufficient standing room for the hen, who clung on the side until her mate fed the family. His 'backing' tactics played havoc with his spruce appearance, his plumage being ruffled and rubbed the wrong way

cock secured about two-thirds of his food in this manner; he foraged in the wet grass for the remainder, to the detriment of his breast feathers, which soon became soaked and bedraggled. His 'backing' tactics played havoc with his spruce appearance, his damp plumage being ruffled and rubbed the wrong way. Preening was attempted in desultory manner but it was not until the day's work was done that he tackled his toilet in earnest. He was always well groomed in the mornings.

As already mentioned, the cock invariably acted first when the pair arrived together. If the hen happened to occupy the inner half of the perch the male would jump over her to reach the entrance. More than once I saw him pass food to the hen, who promptly took it to the chicks. This happened only when she found him on the perch as she left the nest—never when he joined her on the perch. Once when they arrived simultaneously from opposite directions the cock reached the perch first and stood near the middle. There was no standing room for the hen so she clung on

the side, her tail bent forward beneath her to assist in balancing. She maintained this rather strained position until her mate fed the chicks and departed.

I had now reached the last day of my holiday and had come to the conclusion that the family would not leave the nest that day. The chicks were now so advanced and their wing power and instinct of fear so well developed that I reckoned they would probably take flight direct to the tree tops rather than linger on the perch.

Just a few stray remarks, in conclusion. When I left the birds that Sunday evening I knew how remote were the prospects of seeing them again. It was Friday before I could return; I found the nest empty and the orchard woefully dead and deserted, its very spirit gone. After a week of evening visits I saw a cock Pied Flycatcher and watched him feeding near the nest for several minutes but had no means of knowing whether he was my recent friend or a casual visitor. I saw nothing more of the species that season.

Art and Environment in Australia

by BERNARD SMITH

Many articles have appeared in this Magazine dealing with the influence of place on the work of individual artists. The wider question which is the subject of the following article has been exhaustively treated by Mr Bernard Smith in his book Place, Taste and Tradition, published by Ure Smith Publications of Sydney, to whom we are indebted for all the plates illustrating this article

To what extent do the climate of a country and the modes and habits of living which are conditioned so largely by climate affect the production of art in that country? This is one of the most interesting questions that can be asked in the field of art. It is of particular interest when asked of the art of Australia. Indeed it can be said unreservedly that Australia presents the best field for the investigation of this problem because of the absence of so many obscuring factors which are usually present in other countries with older and more complex cultural traditions.

In the first place there is a remarkable unity in both the structure and the human factor in Australia. In structure the country consists of a fertile coastal crescent, an inland drainage system of westerling rivers and slopes flattening to internal plains, and in the interior the dry plateau of an ancient shield. There have never been any racial problems, and the white settlers have been predominantly British. The language is uniformly English throughout and there is no real evidence to show the growth of any regional dialects. Religion has played only a small part in politics and an even smaller part in art. In the greater part of the continent the climate is warm and dry. It is the effect of this warm environment upon the imported English tradition that is the fundamental fact to be considered when discussing the emergence of Australian culture.

The colonization of Australia is largely the story of the settlement of the fertile coastal crescent on the east and south-east. It is the story, too, of a rapidly moving western frontier, followed by the far slower process of closer settlement carried out by the cockies, as the small farmers and graziers are called.

White settlement began in 1788. In 1800 five thousand people were settled in and around Sydney. One hundred years later a population of almost four millions lived in the six States and the Commonwealth of

Australia had been proclaimed. It is clear therefore that the origin of Australian institutions and culture is to be found in 19th-century traditions. Here we may best observe the results of British colonization in a warm environment, and witness the transformation of British institutions and culture in a new and distant land sparsely populated by primitive aboriginal tribes.

From 1788 to 1815 Sydney was a small town bounded on the west by the scarp of the Blue Mountains and on the east by the Pacific: a settlement that in the eyes of the British Secretary of State and the early governors was essentially a gaol for convicts. It was here that the first glimmerings of visual art struggled bravely into existence, a minor reflection, as was to be expected, of English 18th-century visual art. It was a coastal culture, the culture of exiles in one small penal depot of an expanding maritime empire, and its impetus and style came almost entirely, as did its convicts and its laws, from London.

During the early years Australian landscape painting was confined to the rendering of careful records of the early settlements in the precise 18th-century topographical manner. By the 1830's the topographical manner was giving way before a colonial version of English romanticism. It is to be seen most favourably in the work of Conrad Martens (1801-78), who arrived in Sydney in 1835. An admirer of Turner, Martens' best work reveals fine craftsmanship and is sensitively conceived. He painted many lyrical interpretations of Sydney Harbour at a time when it retained its native loveliness.

The peculiar nature of the vegetation worried artists throughout the 19th century. They sought to obtain a careful and literal presentation of the landscape but were embarrassed by the high tonal qualities, the subtle gradations of hue; purples, mauves and blues that merged imperceptibly with the



By courtesy of the National Art Gallery of New South Wales

SIR ARTHUR STREETON

BENEATH THE PEAKS

OIL

heat haze of warm, dry and dusty atmospheres. They were defeated by the exasperating foliage of the eucalypt. These were problems that required the visual integrity of impressionist painting for their solution, and it was not until Australian painters began to study the methods of impressionist painting that they were able to solve these new visual problems presented by the vegetation and atmosphere of the new land.

Impressionist methods were first applied to Australian painting by a group of artists living in Melbourne during the late 'eighties. Sometimes known as the Heidelberg School, they popularized the method of open-air painting, and the importance of truthful and direct statement. By their example paintings of landscape became higher in their tonal qualities. Direct vigorous brushwork replaced the laborious polish of the academies. Although their work is today somewhat out of favour in art circles, it must be asserted that they produced the first authentic version

of Australian landscape. The best canvases of the school give evidence of a real struggle for a new vision. Their reputation has been clouded by the uninspired imitations of their work produced by their followers of today. Arthur Streeton's (1867-1943) *Land of the Golden Fleece* is a good example of the work produced by this school. Another canvas which reveals the qualities of Australia's impressionist painters is *Tranquil Winter*, by Walter Withers. This painting was singled out by R. A. M. Stevenson as the finest in the Colonial Art Exhibition held in London in 1889.

The influence of vegetation upon the art of the country was continued in the work of Hans Heysen (b. 1877). He became famous for his renderings of the gum tree. His paintings have gained tremendous popularity, his work being more frequently reproduced than that of any other Australian artist. As with the Heidelberg impressionists—and his work owes much to their inspiration—his landscapes are falling out of favour in art



By courtesy of Mrs W. S. Strang

HANS HEYSEN

MORNING LIGHT

WATER-COLOUR

circles, though they remain as popular as ever with most people here. In his best works he has revealed the majesty and grandeur of the eucalypt and on many occasions has portrayed the rural settings of a pioneering country with fine feeling.

Impressionism introduced by way of England certainly created a distinctly national flavour in painting. The climate is suited to painting out of doors and it is natural that *plein-air* landscape should have become a very popular method of painting indeed. The tradition thus established by the Heidelberg painters developed rapidly into a kind of local 'grand style'. A flamboyant rhetoric crept into painting as it did into such titles as *The Golden Splendour of the Australian Bush*. Pioneering countries usually create myths about their future as older countries create myths about their past. If Australia was not, like America, "all promises", it was, neverthe-

less, full of hope for land-hungry settlers. The explorer Mitchell called a part of it "Australia Felix". The writers helped to build the myth. Dorothea MacKellar wrote:

I love a sunburnt country,
A land of sweeping plains,
Of rugged mountain ranges,
Of droughts and flooding rains.

It was a land of distant horizons, gaunt gums, magnificent coasts. And this legend was reinforced by the activities of the painters. The landscapist of the 'nineties invested his paintings with the dreams and the sentiments of the pioneers. He felt something of the burgeoning patriotism of the pioneer who transforms his nostalgic love of homeland into a strange new passion for the country that he has learnt to tame with his labour and which has nourished his children. Such landscapes have on more than one occasion occurred in the colonial phase of a new nation's develop-



By courtesy of Charles Lloyd Jones, Esq.

DOUGLAS DUNDAS

THE INN YARD

OIL

ment. If a name may be coined it could be called 'colonial heroic' landscape.

Considered from the point of view of its geographical implications, this first phase of landscape in Australia was followed by 'humanized' landscape. This is the landscape-type predominant in European painting until the beginning of the 19th century. It was the romantics who discovered the beauty of the wilderness, who could, like Turner, transform by their creative imagination a homely prospect into a landscape of the wildest grandeur. And the romantic painted at a time when, in several quarters of the globe, the emigrant was becoming the colonial pioneer. The work of the pioneer was the converse of the romantic painter; it was his business to transform the wilderness into a homely prospect.

Be that as it may, upon the heels of colonial romantic landscape in Australia came

the humanized landscape of a maturing country. It is that "landscape, plotted and pierced, fold, fallow and plough", to which Gerard Manley Hopkins referred. It emerges in the studied mellowness of Elioth Gruner (1882-1939): it is to be seen, too, in the work of Kenneth MacQueen (b. 1897), who is himself a farmer. MacQueen has developed a technique that in some respects is akin to the formalized art of the American, Grant Wood, the artist of America's crop-bearing Midwest. Douglas Dundas (b. 1900), a native of the western slopes of New South Wales, has on several occasions painted the peculiar beauty of landscape that is just beginning to show evidences of human occupation over several generations.

It is interesting to note the close relation between technical methods of painting and the inherent demands of new subject matter. Romanticism and 'Australian' impressionism



By courtesy of the National Art Gallery of New South Wales

ELIOTH GRUNER

ON THE MURRUMBIDGEE

OIL

as artistic methods both lent themselves in their own ways to the depiction of untamed wilderness. The intricate greys and olive greens of virgin eucalypt forest can best be suggested by the broken-colour science of impressionism. On the other hand the settled landscape, the rhythmical lines of fields under plough or clothed with wheat have lent themselves admirably to a modified 'post-impressionist' treatment. This unity between subject and treatment is to be found in the middle period of Gruner's painting and the early works of MacQueen. In this regard it should be remembered that Turner's romanticism was stimulated by his Alpine subjects, that Paul Cézanne worked out the principles of post-impressionism among the age-long cultivated fields of Provence.

From the eucalypt forests of the eastern coastal fringe sprang, during the 'eighties and 'nineties, the school of Australian impressionism. From the settled interior and coastland

of the 20th century there is slowly emerging a softer and more subtle landscape school, a school which will undoubtedly mature with time, though today it possesses only a few exponents, such as Douglas Dundas, Lloyd Rees (b. 1895) and George Duncan. It is landscape that promises to be at times colourful and decorative, at times—as with Rees—sombre.

But the greater part of Australia is either desert or semi-desert. And the desert has been rarely portrayed in art. This is not surprising. The majority of Australians are town and city dwellers living within the limits of a fertile coastal crescent. Yet over five-sevenths of the country consists of either sparse pastoral lands or semi-desert. The very existence of these vast dry spaces must inevitably provide one of the national qualities of her art. Yet it would be foolish to maintain, as some do, that this geographical feature provides the basis for a distinctly

Australian art style. A culture does not spring from an environment but from the subtle interaction of the environment upon the activities, needs and ambitions of the people of the country. The desert environment of the interior has had little influence upon the majority of the people for they rarely experience it directly. It is the environment of an unknown terrain, as spatially removed from their lives as is the environment of New Zealand. But there is one important difference. Although it is unknown, the hot dry centre is nevertheless the *heart* of the country. And it is an unknown heart to the majority of the inhabitants. This mysterious unknown heart provides those elements of fear and wonder, together with a sense of belonging—a kind of national pathetic fallacy—that are the natural elements of romanticism. Where national romanticism develops in Australian literature and art it usually draws in no small degree for its imagery and concepts upon the unknown heart, and the aboriginal of the unknown heart.

This sense of vague belonging is responsible in part for the wide appeal—to all sections of the Australian public—of the finely painted compositions of eroded tree forms that have been completed in recent years by Russell Drysdale (b. 1912). Drysdale is today Australia's finest landscape painter. Maturing slowly, each phase of his work has revealed his growing technical ability for a deeper vision. He has met with real problems in the portrayal of national types, the serviceman, the farmer, the shearer, the rabbitier. He has painted on more than one occasion with rare feeling the true spirit of the small country town, thrown up in the wake of the pastoral extension: towns that, for the most part, are still little more than marketing centres, trade depots for a huge capital city. They ribbon themselves along road and rail ways because they have not attained the central cohesion of true communities. Drysdale's vision of the drought-stricken areas of New South Wales, which he painted from drawings made as he toured



By courtesy of Miss Nesta Griffiths

KENNETH MACQUEEN

THE BUNYIP HOLE

WATER-COLOUR



By courtesy of Captain Neil McEacharn

RUSSELL DRYSDALE

THE BUSH FIRE

OIL



By courtesy of the Yale University Art Gallery, U.S.A.

MARGARET PRESTON

ABORIGINAL LANDSCAPE

OIL



WILLIAM DOBELL

THE STRAPPER

OIL

By courtesy of Captain Neil McEacharn

through the western districts at the height of the great 1944-5 drought, include some of the finest conceptions yet produced by an Australian. Here realism has been welded to poetry. Painting usually within a limited colour scheme, there is always a burning richness in the quality of his pigments.

So far as vegetation is concerned it is, of course, the ubiquitous gum tree that has had the predominant influence upon Australian painting. Yet as early as the 'eighties, Lucien Henry, a French sculptor and art teacher who lived and taught in Australia for ten years, pointed to the great possibilities of an original decorative style based upon the forms of native flowers. Henry was the first to see that these flowers have a hard formal grace, and fall into natural decorative lines.

The waratah, the flannel flower, the banksia, all lend themselves readily to decorative treatment. Henry designed not only numerous decorative patterns from wild flowers but also original motifs for architecture such as lyre-bird capitals. A worthy successor to Henry is Margaret Preston (b. 1883) who for many years has painted, and cut in numerous wood blocks, designs drawn from flora that are vigorously decorative and thoroughly Australian.

So far we have been concerned with the influence of climate and vegetation upon Australian art; there remains to be considered the influence of the aboriginal tribes and of the social activities of the people. In 1788 there were 350,000 aborigines, today there are about 50,000. The aborigine has been



By courtesy of the National Art Gallery of Victoria

FRED MCCUBBIN

THE PIONEERS

OIL

segregated from white settlement and possesses no citizenship rights. Retreating before the spread of the pioneers the aborigines are now located upon the fringes of settlement, in the interior, and along the northern and north-western coasts. Contact with white men has led to cultural degradation and the break-down of tribal unity.

The first white settlers drew many pictures of the aborigine. The 18th century glamorized the life of the 'noble savage', and as a result many of the earliest drawings of Australian aborigines betray the current belief that the aborigine was an unspoiled child of nature living a life of idyllic beauty. Captain Wallis's *Corroboree at Newcastle* is one of the most interesting of these early paintings, both for its primitive grace and admirable construction.

During recent years the international interest in primitive art has drawn the attention of Australian artists to the decorative beauty of aboriginal tribal art. Margaret Preston, after a careful study of aboriginal

paintings, has applied the formal principles of aboriginal art to her own work. The result has been the emergence of a strikingly original style full of colour, stark contrasts and brilliance.

Just as aboriginal art has affected the Western tradition in painting as practised by Margaret Preston, so the influence of landscape painting has been assimilated by at least one full-blooded aborigine. This is Albert Namatjira, of the Hermannsburg Mission, Central Australia. Namatjira's art owes a great deal to the indirect influence of the work of Hans Heysen, but there is poetry and a real feeling for the place in his best water-colours painted in Alice Springs district of Central Australia.

The question what are the typical national characteristics of the Australian will be a controversial one for some considerable time. Although English and American cultural influences have affected Australia over considerable periods, the Australian differs in many respects from both the English and the American national character. The emer-



By courtesy of the National Art Gallery of New South Wales

TOM ROBERTS

BAILED UP

OIL

gence of typical Australian characteristics may be traced back to the first days of the settlement, but it was during the gold rush periods of the 'fifties and 'sixties that these characteristics began to mould themselves into a national complex. A laconic and frequently biting humour, the cult of 'mateship', a love of gambling and horse-racing were born in the mushroom growth of the 'rush' towns. The social psychology of the 'rush' town has persisted and permeated widely into the national character. It was S. T. Gill who portrayed the humour and pathos of the early gold-mining days. He is the forerunner of a fine school of graphic artists and cartoonists that has included Phil May (1864-1903), Will Dyson (1879-1914) and David Low (b. 1891) among its apprentices. Gill's work was produced in the form of lithographic drawings and became widely known in the later 'fifties and early 'sixties.

The interest that Gill displayed in Australian life and the social scene of the 'fifties and 'sixties bore fruit during the 'nine-

ties, that period of national awakening for Australia, when such artists as Tom Roberts (1856-1931), Frederick McCubbin (1855-1917), Frank Mahoney (1862-1917) and, later, George Lambert (1873-1930) painted many genre pictures of pioneering and rural life. Tom Roberts was one of the most important painters who ever worked here. Although an Englishman he succeeded in painting landscapes and Australian life with true local feeling, rarely surpassed during his own day or since.

The Strapper is one of the best-known portraits painted by William Dobell (b. 1899), Australia's finest contemporary portrait painter. Tall, lean and long-headed, the 'Strapper' is typical of many Australian racing devotees. In many of his portraits Dobell has revealed with incisive precision the characteristic qualities of many types. In his *Concrete Consolidation Worker* he portrays one of the workers who assisted in building the Sydney Graving Dock. Nonchalant, sarcastic, the *Consolidation Worker* nevertheless compels attention by the impression which it



By courtesy of the Allied Works Council

WILLIAM DOBELL

EMERGENCY LOADING AT NIGHT, PERTH

OIL

conveys of a tremendous reserve of strength that is not entirely physical.

During the long summer the surfing beach becomes a national institution in Australia. Yet this feature of the social scene has received little attention from her artists. Similarly the tropic north has yet to be interpreted adequately, though some of the attractive water-colours of Douglas Annand are a step in this direction. Unfortunately when Australians paint landscapes they tend to paint them completely void of people. But during recent years there have been signs of a change. Many young painters are now beginning to paint the scene, particularly the industrial life of the cities, with a new vision.

At the most critical time in her history Australia was suddenly brought into contact

with large numbers of the nationals of other countries. Insulated geographically from other peoples, the Australian tends to become a natural isolationist. The influx of racial and political refugees from Europe stimulated thought and cultural activities in the cities. One of the effects has been the reassertion of cosmopolitanism as opposed to nationalism in the art of Australia. At its best this influence has been a chastening one, at its worst it has meant the aimless aping of overseas styles. Again, military necessity brought large numbers of Allied Service men, first Americans, then British, to Australian shores. They came at a time when Australia was fighting for her survival as a nation. And all these new cultural contacts took place when this fight for survival was promoting a revival of national consciousness, when



RUSSELL DRYSDALE

THE DROVER'S WIFE

OIL

Australian literature, periodicals and art were being appreciated, and what is more, were in great demand. The influence of these numerous contacts and of the defeat of the Japanese challenge cannot yet be adequately measured, but it has certainly been considerable.

Australia, it may be concluded, is an interesting and fertile field for the study of the interaction of art and environment. Here English traditions have operated in a warm climate, interacted with other traditions, and out of them is emerging a national culture with international affiliations. The structure of the land—coast, plain and central plateau, the nature of the vegetation—eucalypts and native flowers, have directly influenced the subject matter and the style of art. The influence of the Australian

aborigine has been relatively small due to social ostracism, but it has not ceased since the beginning of settlement. The boisterous days of the gold-rushes, the long pioneering drama, the national aspirations of the 'nineties have all contributed their quota to the evolution of distinctly national qualities in Australian art. Yet although the pattern of all these indigenous factors has been felt deeply, the overseas influences, assimilated constantly at the two large capitals, Sydney and Melbourne, have provided a constant leavening of older ideas and methods. In short, though the study of the art and cultural development of Australia has been neglected both in its homeland and abroad, yet here is a maturing culture that offers a rich field for the art collector, the social historian and the critic.

The Diffusion of Greek Culture

VII. Byzantium and the East

by STEVEN RUNCIMAN

The eastward movement of Greek culture under Alexander and his successors was the subject of Dr Tarn's article in our February 1946 number. After the marriage of Greece with the first Rome, and the fall of the latter, the second Rome again carried Greek influence in a new form in the same direction, though in very different circumstances. The manner and results of this process are described by Mr Runciman, author of Byzantine Civilization

(Right) One of two genii on a 4th-century Sassanian monument hollowed in a rock wall at Taq-i-Bustan near Kermanshah in Persia: clearly related to the Victories of Roman triumphs



Herzfeld

THE part played by the Orient in the diffusion of Greek culture mainly consisted, as readers of the June 1946 number of the *Geographical Magazine* will remember, of the study and conservation by Arabic savants of classical philosophy and science and the acquisition of this Arabic lore by the mediaeval West. But at the same time, throughout the Middle Ages, the great empires of Asia were in constant touch with contemporary Greek civilization, the civilization that we call Byzantine, which had a considerable influence on the development of their culture and the moulding of their destiny.

The eastern elements in Byzantine civilization have been so often exaggerated by historians that its essential Greek background is apt to be forgotten. It is true that the average Byzantine citizen was seldom of pure Greek blood. He might be an Armenian or a Slav, an Aramaean or a Tartar, or of some ancient Anatolian tribe, or, most commonly, a mixture of them all. His capital city was Constantinople, with its damp, melancholy climate, so different from that of Greece itself. He had a taste for eastern fashions, for material luxuries and pomp on the one hand and on the other for stark religious asceticism and intolerance. But this interest in eastern culture was no new thing for the Greeks. It had been effective since the days of the

Phoenicians, and it was inevitable; for only in the East, till the late Middle Ages, could Greece find cultures equal to or greater than her own. The Byzantine himself was deeply conscious of his Graeco-Roman heritage. He called himself a Roman and his language, Greek though it was, Romaic. His emperor was the Roman Emperor, his law Roman Law. Constantinople was, officially, New Rome. But still more, he was Greek. He spoke no other tongue, and, like the Greeks of today, he perpetually tried to force it back into a good classical style. He was brought up on the study of Homer, of Plato, of the Athenian dramatists and all the great Greek writers of the past. His religion, despite its oriental elements, was fundamentally based on Greek philosophy; and even his superstitions were Greek, his saints playing the parts played in older days by gods and heroes and nymphs. His art never lost for long the basic Greek qualities of logic and proportion and restraint. He thus provided a store of living and developing Greek culture from which his eastern neighbours could draw.

This cultural exchange was a two-way traffic. But Byzantium gave out as much as, if not more than she received. During Hellenistic times Greece had imported philosophical ideas from the East and given artistic ideas in return. Neo-Platonic thought

is strongly oriental, while the art of Buddhist India and Han China is definitely of Greek origin. But later on, the categories of exchange became less simple. When the Christian era began the industrial centre of the world was the great Hellenistic city of Alexandria; and new techniques evolved in her workshops had an influence spread wide throughout neighbouring lands. It is disputed to what extent the textile and ceramic industries of Persia owe their origins to Alexandria, but it is certain that large numbers of Egyptian craftsmen were invited to settle in Persia. The characteristic art of the mediaeval Near East, the glass wall mosaic, undoubtedly was started in the glass factories of Lower Egypt. The schools of philosophy that were to exercise most effect on subsequent Near-Eastern thought were those of the rival cities of Alexandria and Antioch, expressed in the form of Christian heresies, Gnostic, Monophysite and Nestorian. The foundation of the new capital at Constantinople resulted in intellectual and artistic activity gradually deserting the older centres for the Bosphorus; and Justinian's centralizing policy in the 6th century and the wars and earthquakes of the 6th and 7th

centuries completed the process. Thenceforward Constantinople was for many centuries by far the most important and active seat of Greek culture.

This culture, in its Byzantine form, had already influenced the East. Despite wars and trade disputes, relations between Byzantium and Sassanid Persia were close. Sassanid art forms greatly helped in the development of Byzantine art; but they were introduced into the Empire mainly by the Byzantine technicians, distinguished visitors or prisoners of war, whom the Sassanid kings loved to employ. As early as about A.D. 250, King Shapur I had employed a Greek engineer to build the bridge that still stands across the River Karun at Shushtar. Shapur the Great, a century later, employed a Byzantine portrait painter; and many Sassanid castles and palaces were attributed to Byzantine architects. In the evolution of the new forms and techniques of the time it is difficult to disentangle the parts played by Byzantine and Persian craftsmen.

In the 7th century the whole position was revolutionized by the coming of Islam, which destroyed the Persian Empire and amputated its richest provinces from the Byzantine. The

The cultural relationship of Byzantine and Sassanid Persia was a two-way traffic. From Persia came the manifestation of authority by magnificent apparel, emblazoned with such regal designs as this bold and dignified fowl. These designs, in turn, entered into the Byzantine Imperial tradition

Vatican Museum



first Islamic dynasty, the Umayyads, settled in Syria, making their capital at Damascus. The new ruling class of Arabs from the desert had no culture of their own, but the Umayyad caliphs were men of remarkable intelligence and tolerance. They did not interfere with the Byzantine culture of their subjects. The savants at their court began that study of ancient Greek thought from which Western Europe was later to benefit. For art and for the amenities of life the Umayyads followed contemporary Byzantine fashions. Many of their highest officials were Christians, men such as St John Damascene; and the state papers were kept in Greek for several generations. For their country palaces, such as Qusair 'Amra, Mshatta or most striking of all, Kasr el-Heir, Byzantine architects and decorators undoubtedly were employed (though Qusair 'Amra shows signs also of Persian artists' work and in defiance of Islamic rules, the human figure was frequently reproduced). Still more Byzantine were the great buildings of the cities. Abd el-Malik's Dome of the Rock at Jerusalem is the supreme example of the architectural style that the Byzantines had developed out of the Roman rotunda; and its decoration is known to have been the work of Byzantine mosaicists. Still lovelier are the

mosaics in the courtyard of Walid I's Great Mosque at Damascus, country scenes made in the easy but slightly formalized style of the Classical Byzantine school by artists who knew and loved the scenery surrounding the Syrian capital. Indeed, during the late 7th and early 8th centuries, a grim, austere and poverty-stricken period in Byzantine history, Greek artists found greater scope for their talents under the Moslem Caliphate than under their own Emperors. The development of the art of illuminated manuscripts amongst the Arabs is further witness to their influence.

The accession of the Abbasid dynasty and the transference of the Arab capital to Baghdad in Mesopotamia meant the replacement of Byzantine cultural influence by Persian. Persian luxury, Persian ideas of the isolation of women, Persian intolerance succeeded to the easier, more liberal life of the earlier caliphs. But the connection with Byzantium did not vanish. The courts of Baghdad and Constantinople were in constant communication. Like the Sassanid kings, the Abbasid caliphs welcomed Byzantine technicians. Not only were Byzantine visitors consulted about the lay-out of the new capital, but the Ambassador Tarasius,



Stanford, London



From "Early Muslim Architecture" (Clarendon Press)

In the 7th century A.D. many Byzantine provinces came under the sway of Moslem rulers, who brought over the culture of their subjects. The Great Mosque at Damascus, capital city of the Umayyads, displays early 8th-century mosaics depicting in the Classical Byzantine manner the charms of Syrian provincial scenery

more gifted than the diplomats of today, built for the Caliph Maḥdī in A.D. 775 a huge water-mill that long remained one of the sights of Baghdad. Byzantine men of learning were always welcomed by the caliphs, particularly by the 9th-century Caliph al-Ma'mūn, during whose time such eminent Byzantines as John the Grammarian, St Cyril, future apostle to the Slavs, and the future Patriarch Photius all were entertained at Baghdad. Ma'mūn himself kept up a long correspondence with the great Byzantine mathematician and scientist, Leo the Philosopher, whom he vainly tried to lure into his service.

The gradual disruption of the Arab world, from the 10th century onward, while it increased Byzantine influence over the small states of the frontier, made it less effective on Islamic culture as a whole. With Fatimite Egypt Byzantium was never on such close terms as with Baghdad; though we find Byzantine prisoners of war in great demand as artisans in Egypt. The Crusades complicated the position, offering the Moslems the rival and novel influence of Western Europe, though the Westerners received far more than they gave. Yet Byzantine craftsmanship still enjoyed the highest prestige. When he wished to repair the Mosque el-Aksa on his recovery of Jerusalem it was to Byzantium that Saladin sent for mosaicists, impressed perhaps by the Byzantine mosaics

set up a few years previously at Bethlehem.

With the Arabs' successors in the hegemony of Islam, the Turks, Byzantine relations were far closer. Since the dawn of the Middle Ages Byzantine diplomats and merchants had kept contact with the various Turkish tribes of Western and Central Asia. The most civilized of these, the Khazars, whose conversion to Judaism was one of the oddest phenomena in the history of the Steppes, had even provided Empresses for Byzantium, and had received numerous missionary expeditions and military missions. Byzantine engineers had constructed for the Khazar Khan his only stone-built fortress, at Sarkel on the lower Don. To the east of the Khazars were many Turkish tribes, notably the Ouigours of Western China, who followed the Nestorian form of Christianity and thus had an indirect connection with Byzantine culture. But the Seljuk Turks, who were actually to annex and colonize Byzantine lands in Anatolia, received their faith and their fundamental culture from Moslem Persia as they passed. Seljuk political organization, Seljuk literature and Seljuk architecture were all Persian in origin. Their empire soon lapsed into feudal disorganization; their literature necessarily followed their religion, and their architecture remained Persian, with a curious twist of their own. But once they were settled in Anatolia, they were subjected to strong Byzantine influences. Constantinople possessed an in-

The Dome of the Rock at Jerusalem (A.D. 691), the earliest existing monument of Moslem architecture, is "the supreme example of the style that the Byzantines had developed out of the Roman rotunda"





From "Early Muslim Architecture" (Clarendon Press)

(Left) *Graeco-Roman tradition predominates in the design of the mosaics of the Dome of the Rock.*
 (Right) *On the desert's edge east of Jordan the Umayyad Caliphs built palatial residences; the carving at Mshatta here shown is attributed to Copts, who brought Byzantine art-forms from Egypt*

evitable attraction for the Seljuks. Their princes would go there for their education or for official visits and would welcome Byzantine savants at their courts. Byzantine craftsmen would work for them; Seljuk carving and the minor arts are distinctly Byzantine. At one time it seemed likely that the whole nation would pass over to Christianity and end as a group of Byzantine vassal states. Many converts were made in the princely families, and the Emperor Manuel I in the mid-12th century fell into heresy in his desire to find a formula that would make conversion easier. But this possibility, which would have given Byzantium new life, was spoiled, first by the weakening of Byzantium owing to the Fourth Crusade and the unhappy interlude of the Latin Empire, and secondly, by the conversion of the Mongols to Islam and the coming of the Ottoman Turks.

The vast Mongol Empire of Jenghis Khan, which dominated world politics from the

beginning of the 13th century, was at first a state of little civilization and no official religion. The Khans were pagan animists, but their women-folk were mostly Nestorian Christians. This feminine influence aided other Christian influences; and when Jenghis's great-grandson Abaqa, ruler of Persia, married the able Byzantine princess Maria Palaeologaena, for a generation Byzantine influence dominated the Persian Court. But it never took root; the Western Mongols soon adopted Islam, the faith of the bulk of their subjects, just as their Eastern cousins adopted Buddhism. Finally this Moslem revival was made sure by the entry into Anatolia of the Ottoman Turks, a tribe more aggressive and more devoutly Moslem than the Seljuks.

The aim of the Ottomans was to destroy Byzantium and to succeed to its place; and they pursued their aim relentlessly. They were suspicious of Byzantine influence. But



By courtesy of the Turkish Embassy

In 1567-74 the great Turkish architect Sinan erected the Selimiye mosque at Adrianople which, though minarets are an integral part of its design, evidently reflects his intimate study of—

the growing numbers of their Greek and Christian subjects and the racial tolerance that permitted them to marry Greek wives and enlist soldiers of Greek origin had an inevitable effect. By the time of Sultan Mohammed II, the conqueror of Constantinople, the dynasty was almost pure Greek in blood. Mohammed the Conqueror was a statesman in the Greek tradition, wily, subtle, imaginative and broad-minded. Despite his ruthlessness at the time of the Conquest, he understood and liked the Greeks

and even toyed with the idea of adopting Christianity. With the Ottomans established in Byzantium itself, Byzantine influences were bound to permeate them. The culture of the court remained Persian. The palaces, with their sequence of tiny chambers and pavilions, recalled the encampments of Turkestan. Their system of government, despite superficial resemblances, was not so much Byzantine as Persian, except in fiscal affairs, for which Greeks were very largely employed. But the life of the middle

and lower classes in Constantinople and the other cities was in the Byzantine tradition. Apart from the palaces, architecture followed Byzantine models. The first eminent architect of Turkish Constantinople was the Greek Christodoulos; and Sinan, the 16th-century janissary, who was one of the world's greatest architects, based his style on an intimate study of Justinian's cathedral of Saint Sophia. Thus it is that the ultimate development of Graeco-Roman architecture is to be found in the mosques of Istanbul.

Mohammed the Conqueror placed all his Christian subjects, apart from certain heretical sects, under the Orthodox Patriarch of Constantinople. At the Patriarchal Court Byzantium lasted on. Its organization was Byzantine; and the Byzantine tradition of scholarship was preserved there. The first Patriarch under the Turks was the learned philosopher George Gennadius; and, two centuries later, the Patriarch Cyril Lukaris still maintained the level set by the early Christian fathers and philosophers. After his time persecution and consequent corruption lowered the standards of the Patriarch-

ate; but by then the great secular Greek families of Constantinople were emerging to carry on Greek culture and Byzantine habits. They found most scope for their activities in the semi-independent principalities north of the Danube. Modern Roumania, whose name shows it to be the heir of Roum, the Romaic Empire, is one European country where Byzantine forms and practices, not always at their happiest, have lingered into modern times. Meanwhile the Patriarchate, for all its debasement, kept alive in the Church a strong feeling for Hellenism, which bore fruit in the war of Greek Independence and in more recent Greek struggles, where the clergy, however simple and rough, have played a leading and an unfailingly courageous rôle, conscious of their great Greek heritage.

With the Christians of the East that dwelt beyond its borders, the relations of Byzantium were complicated and confused. Most of them belonged to heretical sects, which had arisen less from philosophical differences in doctrine than from political or national reaction against the centralizing tendencies of

—the cathedral of Saint Sophia at Constantinople, built in A.D. 532-7 by the Emperor Justinian and his pious ex-actress wife Theodora. Minarets were added after the Turkish conquest in 1453

Rafet Zaimlar





From "Icons of Yuhanna & Ibrahim the Scribe" (Nicholson & Watson)

An icon of St George, painted in 1753 for a Coptic church in Cairo by Yuhanna "the Armenian" and Ibrahim, a Copt. Though more than a thousand years had elapsed since the great era of Coptic artistic achievement, these painters were still working upon the precepts of the Byzantine icon

Constantinople. When the Eastern Christians passed under the rule of Islam the reasons for this disruption vanished, but the bitterness lingered on. The members of the Orthodox Church, grouped under the Patriarchs of Antioch, Alexandria and Jerusalem, had before Islam been somewhat jealous of Constantinople. After the Moslem conquest they became quite frankly the agents of Byzantium. They regarded themselves as the subjects of the Empire *in partibus*. Though they might take service under the Caliph and were obliged to obey his laws, they considered the Emperor to be their sovereign. They were not numerous but were comparatively wealthy, dwelling mostly in the towns and larger villages of Palestine and Syria. Later on Greek immigration added to their numbers. In an unobtrusive manner they helped Byzantine ideas to

percolate constantly through the Caliphate. At the time of the Crusades they formed the strength of the pro-Byzantine party in the Latin principalities.

The Monophysites, whose secession and hostility did much to facilitate the Islamic conquest, suffered largely by that very conquest. Their community in Syria and Palestine, known usually as the Jacobite Church, was henceforward a body of very little significance. The Monophysites of Egypt, however, the Copts, remained and remain rich and powerful. They inherited the great traditions, largely formed in Egypt, of early Byzantine art and culture. But they kept very little contact with later Byzantium; and their work, artistic and intellectual, gradually became cruder. Yet they had an enormous effect on the development of the Islamic art of Egypt, and their crafts later penetrated to Western Europe through the medium of the Italian trading cities.

The Monothelete community of the Lebanon, known as the Maronites, had very few relations with Byzantium. At the time of the Crusades it linked itself to Rome and is one of the oldest of the Uniate Churches. The Nestorians, though they originated in Syria, soon moved their activities further to the East. They had their centre in Mesopotamia and had flourishing daughter churches in India and China and at one time were the dominant religion in Turkestan and Mongolia. Because their field of enterprise was so far removed they were tolerant of and eager to cooperate with other Christians. The Nestorians were prepared to act as Byzantine agents in the distant East. Men such as the Nestorian monks who smuggled the silkworm into Byzantium for the Emperor Justinian proved themselves of great value to the Empire. Through their work a thin but constant stream of Graeco-Byzantine philosophy and art was pumped into Further Asia; while in the Caliphate they played a considerable part in preserving and promulgating Greek culture. Unfortunately the Nestorian Church suddenly and rapidly declined towards the close of the Middle Ages, partly because of a revival of Islam and of Buddhism in Central and Eastern Asia and partly because of the missionary zeal of Rome, which caused a schism and led to the foundation of the Uniate 'Chaldaean' Church.

From the Byzantine point of view the most important of the heretics of the East were the Armenians. The Armenians were Monophysites, not so much from conviction as because their delegates had not arrived in time at the Oecumenical Council of Chalcedon and therefore refused to be bound by its

decisions. The Armenians are perhaps the oldest nation in the world, endowed with immense vitality and almost every talent except political wisdom and cohesion. Situated midway between Byzantium and Persia, the two great cultural centres of the Middle Ages, Armenia could absorb ideas from either side and could develop them in her own isolated valleys. But, though the Armenians hated Byzantium and were more often under Moslem than under Byzantine domination, Constantinople remained their chief cultural magnet. Like the Scots in English history, they would pour down from their barren mountain-sides into the Empire, and if they adopted the official religion could secure the highest posts in the administration, resented but accepted by the Byzantines, with whom they inter-married. So successful was this invasion that a large number of Byzantine Emperors and Empresses were Armenians, and during the 10th century we find usurping Emperors, the legitimate dynasty and the Patriarch all of Armenian origin. Apart from the arts, Armenian culture was negligible. In addition to their main heresy they were given to all manner of nastier heresies, one of which, of Gnostic foundation, was to spread through the Balkans into Western Europe, to flourish in France as the Albigensian.

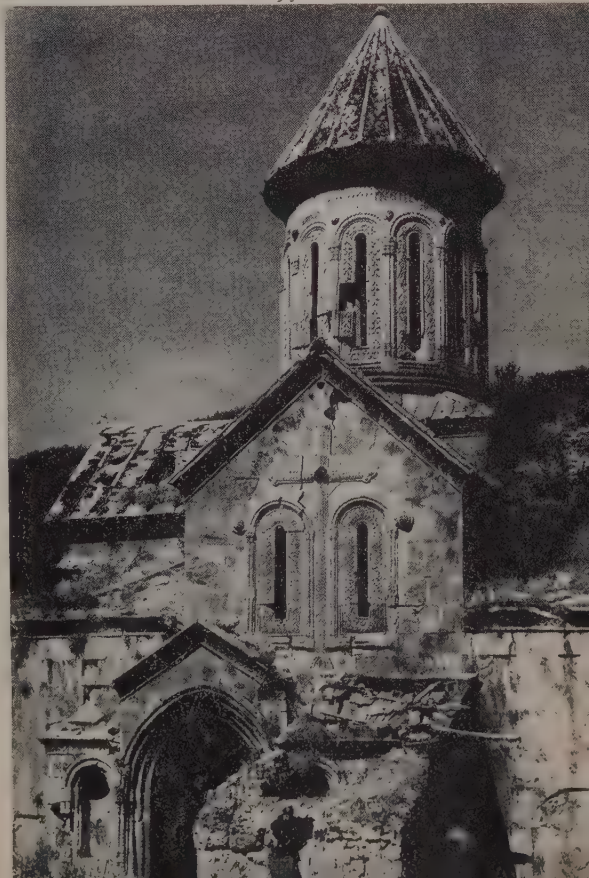
The question of mediaeval Armenian art is still controversial. Its basis was Byzantine; but the Sassanian Persian influence was enormous, especially in architecture. Armenian architects showed unrivalled mastery in constructing vaults and domes, and were frequently employed by the Byzantines, particularly in the provinces. The Armenian Tiridates, who built the cathedral of Ani, then the Armenian capital, was engaged to repair the dome of Saint Sophia in Constantinople after the earthquake of 989. The major 11th-century churches of Greece, Daphne in Attica, Holy Luke in Phocis, the Nea Moni in Chios, were undoubtedly designed by Armenian architects. This is not the place to discuss the part played by Armenians in the development of Romanesque and Gothic architecture, important though it was. In the pictorial arts the Armenians were less enterprising. They were too poor to make use of mosaics, the most admired medium of the time. Their fresco-painting was crude. Their illuminated manuscripts, though they show certain individual characteristics due apparently to Persian influence and a touch of *chinoiserie* that is harder to explain, were strongly affected by Byzantium. It is possible that these illuminations, reaching Italy from the

late mediaeval Armenian kingdom of Cilicia, had some effect on early Renaissance art. In minor arts, such as textiles and ceramics, where Armenian craftsmen came fully into their own after the establishment of the Ottoman Empire, Persian influence was paramount. But in the main the Armenians were heirs of the classical tradition handed on by Byzantium; and their widespread colonies diffused the tradition further.

Beyond Armenia lay the nations of the Caucasus, of whom the Arab geographer Masudi said that God alone knew the number. Of these in the Middle Ages a few remained heathen, some were early converts to Islam, one or two followed the Armenian heresy, and others, including the most important, the Georgians or Iberians, were Orthodox, with an autonomous church in full communion with Constantinople. The Georgians were culturally close to the Armenians; indeed, the

The Caucasian region was a meeting-place of Byzantine and Persian culture; features derived from both sources were widely diffused by emigrant Armenian architects. The 14th-century church at Pitoreti exemplifies the close cultural relationship between Armenia and Georgia

Society for Cultural Relations with the U.S.S.R.



same saint had invented their respective alphabets. But they were jealous rivals, and their orthodoxy was an expression of this rivalry. It also, though they too were subject to Persian influences, kept them in a more intimate connection with Byzantium, and their culture was consequently better developed. It reached its apogee in the 13th century, under the great Queen Tamar. There are Georgian literary works of high merit, notably the epic of the *Man in the Panther Skin*, by Rustaveli, a work akin to the great epic of Byzantium, *Digenis Akritas*. Georgian law, both civil and religious, is entirely derived from Byzantine codes. In the arts, though Georgian architecture with its high conical towers was given a characteristic style by local needs and materials, there was always a strong Byzantine influence, coming from Constantinople or from the late Byzantine Empire of Trebizond. A few wall mosaics were erected in Georgia. There are mediaeval frescoes, closely akin to those of Trebizond, and there was a flourishing school of Georgian panel icon-painting, of an austere and intense style but classical in its balance and restraint. The Georgians also produced enamel work of a quality little inferior to that of Byzantium from which it was obviously derived. Georgian art had

a vast influence on the art of Russia; and the resemblance of early Roumanian art to the art of Trebizond is probably to be explained by this Georgio-Russian connection.

If the remnants of Byzantine culture now left in the East seem to be very sparse, we should not be deceived into the belief that few ever existed. Their disappearance is due mainly to the turbulence of Near-Eastern history in the later Middle Ages. Till the 12th century the Near East, both Byzantium and the Arab world, and especially the former, preserved and developed Greek culture as a living force. But a series of barbarian invasions, coming simultaneously from east and west, fatally ruined its prosperity. The Crusaders from the one side and the Turks and Mongols from the other did damage far wider-spread and far more irrevocable than ever the Goths, the Vandals or the Huns had achieved. After these invasions the Graeco-Roman heritage passed, rather tumultuously, to Western Europe; in Eastern Europe it was driven underground; and Western Asia slowly sank into the slumber from which it is now awakening. Memories of Byzantium, as of Umayyad Damascus and Abbasid Baghdad, lingered only as a dream, that might inspire idealistic patriots but have little reality in the world of today.



A 12th-century silver plate from the Gelati monastery in Georgia, with Georgian lettering. In the absence of such marks, Georgian and Byzantine metal products of the later mediaeval period are often hardly distinguishable

Abdullah and his People

by PETER HILL

A FANFARE of trumpets announced the arrival in the officers' mess of the Emir Abdullah Ibn Hussein, Descendant of the Prophet and ruler of Transjordan. The Emir, who was the guest of honour at a Royal Air Force 'dining-in night' at Amman, his capital, wore spotless white robes and turban, white buckskin shoes, a black beard and a kindly, shy smile.

Since 1921, with a British Resident as adviser, Abdullah has been ruler of Transjordan which was under British Mandate

until May 1946. In that month Transjordan was declared an independent Arab state with the Emir Abdullah, who has proved on the whole a wise and cautious ruler, its king.

It was a long dreary dinner, for only two of his hosts spoke any Arabic and a gloom was cast by the absence of wine, the Emir being a pillar of the Moslem faith. Besides his objections to alcohol, Abdullah has strong views on the proper veiling of Moslem women

and has given orders to the police to take in charge any woman wearing too flimsy a model. He also regards askance any public demonstration of affection between man and woman; nor is the Emir in sympathy with the Western tendency towards brevity in women's dress. He is reported to have walked out in the middle of the opening performance at the local cinema—the first one in his capital—when the hero and heroine embraced ardently; so the programme was chosen most carefully when he expressed a wish to visit our camp cinema; nothing but good healthy Wild West films and news-reels. Unfortunately a mannequin parade of beach wear was overlooked.

Sir Ronald Storrs tells of how he once gave to Zaid, Abdullah's younger brother, a gold wristlet watch. On a later occasion he inquired how the watch went, only to be told that "one stronger than myself has taken it from me". That was big brother Abdullah. Another story is told of how the Emir was invited to spend a night on a new French liner that was anchored at Haifa. He was very intrigued with the sports room on board. The next morning he rose at five, which meant that the captain had also to rise early to accompany him, and went to the sports room where he spent the next two hours firing a toy gun at a target in the form of an animal.



The Emir Abdullah Ibn Hussein of Transjordan: since May 1946 an independent state. He has long been a champion of Arab interests and a firm advocate of Anglo-Arab understanding



Transjordan's Arab Legion has an enthusiastic band which even includes bagpipes among its instruments. Formed in 1921, the Legion, assisted at times by a detachment of the R.A.F., has curbed the raids of warlike tribes that formerly disturbed Transjordan's 40,000 square miles of desert



A local gymkhana brings back a more impressive memory of Abdullah. It had taken place at Zerqa, the headquarters of the Transjordan Frontier Force, and a stream of cars was returning over the dusty hills to Amman on a lovely sunny evening. Somehow it was reminiscent of a crowded road after the last race at a 'point-to-point'. We came round a corner to find several cars pulled up on the roadside and saw a few yards away, kneeling in a field, a white-clad figure—the Emir, turned towards Mecca, saying his evening prayers.

Abdullah's 350,000 subjects are mainly beduin Arabs, many of whom boast of their pure beduin stock. A number of tribes, in particular, known collectively as El Balqa, have a saying *Zai Arab al Balqa ma talqa* ("The beduin of Balqa have no equal"). They are a fine, primitive and often unruly lot, with their sparse, tall figures swathed in camel-hair robes under which can be seen a



Patrolling legionnaires off duty relax in their tent. The corporal has a smoke. During the war the Arab Legion, placed at Britain's disposal, helped to suppress Iraqi rebels and cooperated with us in Syria

leather belt and shoulder cross-straps often carrying a small armoury. In recent times many of them have abandoned their traditional nomadic habit of moving their flocks of sheep, camels and goats continually to fresh pastures and have adopted a more settled existence, still living in their black tents but remaining near a village or town and cultivating the land. Each year they harvest their crops by hand: reaping the corn with a sickle, carrying sheaves on donkeys guided by the women, threshing with oxen and a heavy wooden 'sledge', and winnowing the grain by tossing it in the air.

A remarkable feature in the peaceful organization and administration of the country is the Arab Legion, described as a para-military police force, which was originally organized by Colonel Peake Pasha and is now commanded by Brigadier Glubb. As well as the normal activities which we associate with a police force, the Arab Legion includes a separate organization, known as

the Desert Patrol, to police the 40,000 square miles of Transjordan's desert and to curb tribal raids and disturbances. Members of the Desert Patrol are conspicuous by their fine figures, long hair which they wear in plaits and scarlet cloaks lined with sheepskin. Originally they patrolled the desert on camels; now their mode of transport is normally by armoured car.

The townsfolk include fat Turks, their head surmounted by a red tarbush and their corpulence encircled by a broad silk sash; Circassians whose astrakhan hats are coveted by the European women; Armenians who are considerably more Westernized than most of the population; and Arabs, some of whom adopt European dress but retain the head-dress of cloth, usually coloured, held in place by a black cord. The European dress is in some part due to the mission school, for, after a few days in their native costume, the boys will voluntarily adopt our dress on finding that their flowing garments are ill adapted to

games like football. The pupils take less easily to European beds, on which the school authorities insist, as a cleaner alternative to the mattress or blanket on the floor. At first they simply cannot sleep in them, some boys having to tie themselves in, others preferring to sleep underneath.

The Feast of Bairam showed me the Moslems, who comprise by far the largest section of the community, enjoying themselves. Lesser Bairam terminates the fast of Ramadan, which occurs during the ninth lunar month of the Mohammedan year, during which month good Moslems neither eat nor drink from sunrise to sunset. At sunset a gun is fired, the signal that the people may eat and drink till daybreak. To European minds this rather defeats the day's fasting

A water-hole is sighted in the desert and the beduin halt and fill their goatskins. In recent times many of Transjordan's beduin have adopted a more settled existence



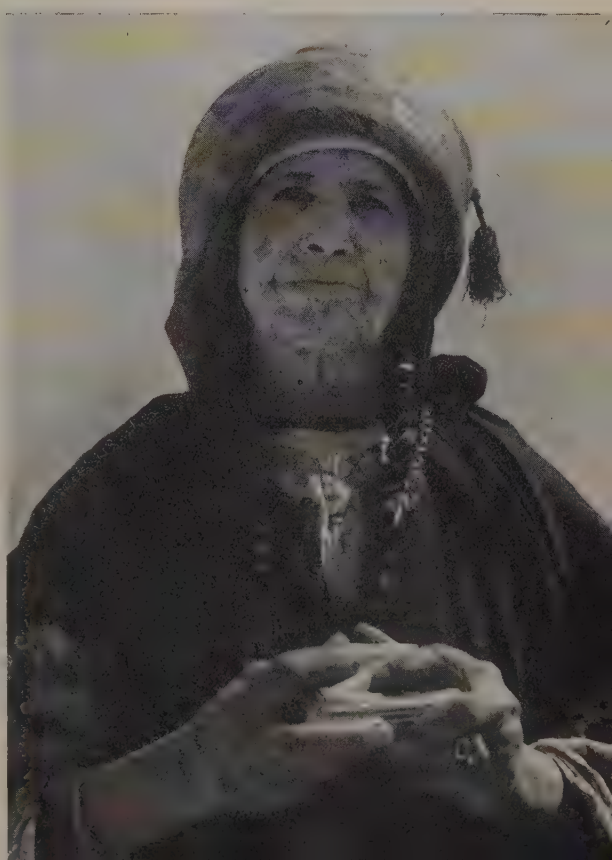


Beduin women near Amman, wearing the flattish headgear on which they balance their pots and pans. Despite a fickle rainfall, Transjordan has considerable pastoral and agricultural wealth and large numbers of camels, sheep and goats are exported annually. (Below) A tattooed beduin woman; she is holding a snuff-box

and causes a serious drop in the output of the next day's work. The signal for the end of Ramadan and the beginning of five days' festivity is the first sight of the new moon. If there should be much cloud about at this time the news usually comes by telegraph from Egypt and is broadcast by a salute of guns.

At the sound of the guns everyone puts on his best clothes and prepares to enjoy himself. Arab enjoyment consists of filling the stomach and chattering more than usual, strong drink being forbidden. The year that I was there the Emir drove early in the morning in state to the mosque and then returned to hold a levee at his palace, where the guests sipped coffee from hand-painted cups of delicate china while a band of the Arab Legion played skirls on bagpipes outside.

Meanwhile the town was *en fête*, crowded with gaily-dressed people all of whom looked cleaner than usual. Plenty of colour was provided by the women and children who had put on their party clothes for the occasion. The townsfolk wore cheap gaudy frocks, probably mass-produced in India or Manchester. But the women from the desert still retained their national dress. Normally they look like bundles of dark, dirty rags, but



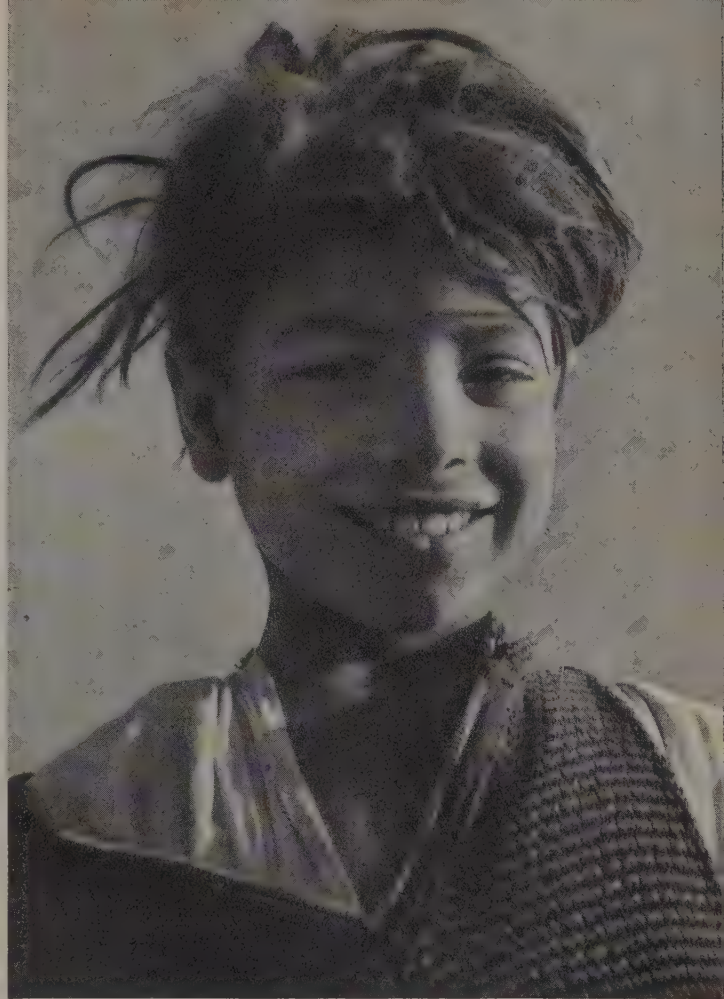


The Moslem fast is over and the motley townfolk of Amman are intent on feasting and merry-making. Most of the girls wear cheap frocks from Manchester or India, but the woman on the swing still retains her

today we could discern the fine and colourful embroidery that bordered their dresses. Most of them wore long garments of blue colour, occasionally black, and the younger ones had little coloured jackets and gay shawls. Their hair was in long greasy plaits and the elder women wore a flattish turban-like headgear on which they balance their pots and pans. Many of them were tattooed. The men wore the customary beduin dress, which consists of a long white shirt, goat or camel-hair cloak, often embroidered in gold thread, and a headcloth whose colour varies with the owner's tribe. The townsmen, despised by the beduin, wore Western dress with a tarbush or headcloth.

At the foot of the old amphitheatre (a relic of the city's flourishing period under Roman rule in the 3rd century B.C.) there had been erected swings, a roundabout and stalls offering foodstuffs of nauseating appearance. The swings consisted of scaffolding poles with a cross-bar from which was suspended a wooden plank slung in two loops of rope. It all looked most rickety and dangerous but no casualties occurred whilst we were there. The roundabout was a tiny affair which seemed to be worked by a large size in primus stoves.

There were more sophisticated parties too. I went to one given by a Christian Arab who was a fat and good-natured employee of a local bank. We did not know what to expect, for it takes some time for the English to realize that Arabs can be as 'civilized' as ourselves. Except for half-a-dozen English, an Italian doctor and his wife, and two Graeco-Italians, everyone was Arab or Armenian. Most of the men wore dinner-jackets or "smoking", as they call them, and all the girls had pretty evening frocks. The Christian Arab girls were more emancipated than the Moslems, but public opinion in Amman, stronghold of Islam, made life a little difficult for them. Any woman who goes unveiled in the town is a target for the remarks of the Moslem men. Such remarks are often very offensive, as European women who know Arabic have discovered.



East meets West in the dress of an Arab boy from Amman who has acquired a cast-off European pullover with a 'zip'

All photographs by Peter Hill

The previous summer several of the Christian Arab and Armenian girls played tennis with bare legs on a court that was open to the view of men sitting outside a café. This year they decided they would rather give up tennis than listen to the comments again.

But here, away from local Grundies, they could do as they pleased. We danced to a gramophone, made use of a well-stocked bar and ate off a table spread with a variety of delicacies. Everyone spoke English, with varying fluency, and an Arab youth, educated at the American University in Beirut, periodically ejaculated, "Oh boy!" "That's swell!" or "Swing it, baby!"

A Glimpse of Petra

by PETER HILL

THERE are few more natural strongholds than Petra, the ancient capital city of the Nabateans and the centre of their caravan trade at the close of the 2nd century B.C. The city lies in a rock basin in the midst of the range of mountains that stretch across the western border of Transjordan, rising over 3000 feet, and forming an almost impenetrable barrier of solid rock.

The Nabateans are thought to have been an intermixture of Edomites and Arab tribes who turned from a nomad life to trade, originally using Petra merely as a store for their plunder. At first they were little more than brigands, ambushing the caravans of merchants crossing the Arabian desert. But by the 4th century B.C. the Nabateans appear to have settled in Petra and became rich business men. The only practicable route across the mountains was through Petra, so large tolls were levied and a clever system of buying and selling set up. These people kept very much to themselves, weaving a romantic shroud of mystery round their persons—a shrewd business move which increased their power. They had their own king, religion, culture and script. Slaves were introduced and foreign craftsmen were brought in to build temples and tombs, the result being an assortment of architectural styles. Petra affords almost unique examples of the architectural art which flourished under the Ptolemies towards the end of the 3rd and following centuries B.C. The latest buildings of the 2nd century A.D. are a confusion of classical tradition and barbaric execution.

But by this time the Romans eventually gained control over the Nabateans and their domains were reduced to a Roman province by the Emperor Trajan. From then on Petra's power slowly waned. Many of the less submissive Nabateans, disliking the rule of another power, sought fortune elsewhere. Trade routes changed and Petra's commercial importance was gradually replaced by Palmyra in Syria, whither many of her merchants betook themselves.

There are only two entrances to Petra through which baggage animals can pass, and these are so narrow and overhung that a handful of men could keep an army at bay. The eastern entrance, the Syk, is a dim, mysterious gorge about a mile and a quarter in length, flanked by sheer walls of red Nubian sandstone towering in places to 1200

feet. The gloom is brightened only by the pink flowers of giant oleanders. The Syk is mainly the watercourse of the Wadi Moussa, which flows right through the centre of Petra from the spring which, it is said, Moses produced by striking the rock. The gorge finally leads into the mile-long central valley of Petra, enclosed by fierce, red-brown crags, often banded with strata of mauve and ochre. At their feet lie tombs, temples and palaces, all carved out of the mountain-side itself.

The Nabateans took great care of their dead. The tombs display varying styles and degrees of grandeur according to the nationality of the craftsmen and the social position of the deceased. There are Egyptian obelisks, traces of Persian sculpture, graceful bits of Hellenistic work and Roman solidity. But they are façades only, the insides being bare and uninteresting. Any treasure they may have held disappeared long ago.

Only one house remains standing in the valley itself, the "House of the Daughter of Pharaoh", but the rock walls and adjacent wadis are riddled with over a thousand natural caves and rock dwellings, reached by flights of steps.

Two of the most impressive monuments are the "Treasury" (El-Khazneh) and the "Convent" (El-Deir). The first is Petra's masterpiece—Hellenistic in style with a magnificent portico and Corinthian columns with richly sculptured capitals and cornices. It had at one time been a temple of Isis but is called the "Treasury" by present-day Arabs, who believe that the vast treasure of one of the Pharaohs is hidden in the huge stone ball surmounting the portico, made unobtainable, however, by his magic. The ball is scarred by the bullets of modern Arab treasure seekers.

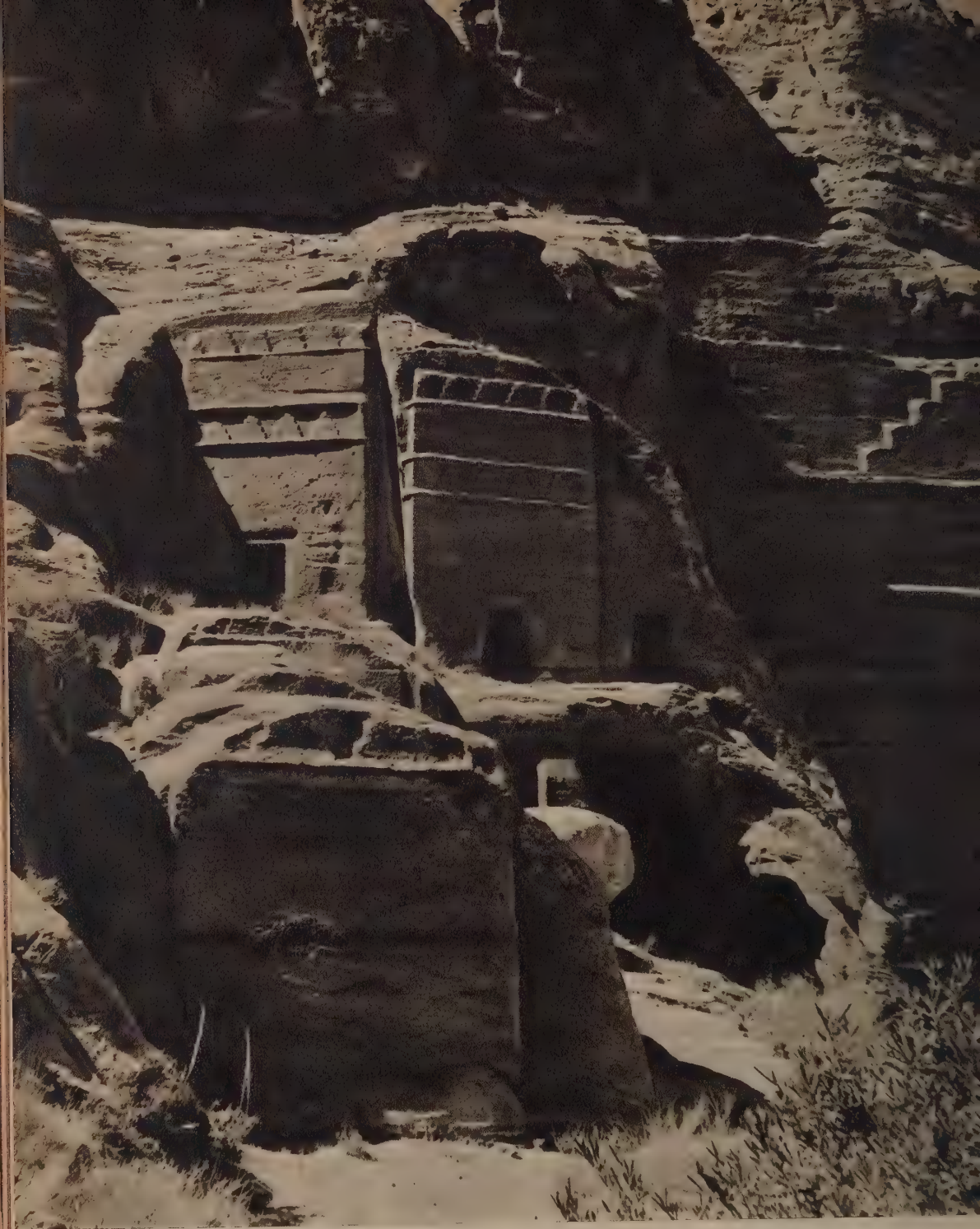
The temple called the "Convent" is high up on a crag, reached by a triumphal way which passes a number of cisterns cut in the rock to collect water. The building has a stark simplicity in its classical lines.

All these monuments are perhaps more impressive in their strangeness of form and the inordinate amount of work involved rather than in style. Only façades now remain of "the rose-red city, half as old as time". Petra once sheltered a population of about 30,000. Now the valley is deserted except for a small beduin tribe which camps in its caves and the occasional visits of archaeologists and of tourists with their paint-boxes.



All photographs by the Author

The Syk, one of the two entrances to Petra: the Nabataeans paved what is now the rough bed of the wadi



The tombs of Petra reflect many architectural styles. The decoration of this group suggests Assyrian influence—



-while these, with their solid outlines, have a Roman look. All are carved out of rock of various vivid reds



The amphitheatre of Petra, hewn out of the mountainside, has thirty-four rows of seats for nearly 4000 people



The Obelisk tomb, cut from especially brilliant rock, may have been the work of imported Egyptian craftsmen



Arab tradition alleges that the stone ball surmounting the "Treasury" contains a hoard hidden by Pharaoh



Men seem mere midgets beside the "Convent," a temple as high as St Paul's Cathedral among the crags of Petra



New Methods in Antarctic Whaling

by DR F. D. OMMANNEY and F. L. WESTWATER

The whaling fleet has sailed for the Antarctic again. Modern factory ships are equipped with aircraft and with many new devices, such as radar and asdic, developed in the war against submarines and now making an important contribution to the campaign against the present world shortage of fats

WHALE oil is one of our most important sources of animal fats. It is used as an alternative to vegetable oil in the manufacture of margarine and soap, and glycerine is one of the by-products of these processes. During the war years, after the southern whaling season of 1940-41, the whaling fleet of some thirty or forty great factory ships of 20,000 tons gross or more virtually ceased to operate. This and very many other causes resulted in a serious world shortage of fats so that the whaling industry has taken on an even greater importance than it had before the war.

Immediately after hostilities ceased in Europe three British and six Norwegian factory ships, newly fitted out, sailed for the Antarctic whaling grounds once more. Of these one British, *Southern Venture*, and one Norwegian ship, *Norval*, were new ones specially built in Britain during the war. This year (1946-7) there will be on the whaling grounds five British, seven Norwegian, one Dutch and two Japanese ships. Two of the British ships, *Balaena* and *Southern Harvester*, and the Dutch one will be new, making their maiden voyages. They are all of the order of 15,000-25,000 tons and they embody all the latest improvements and devices for detection and navigation evolved during the war. It is also reported that a 29,000-ton factory ship, the *Slava*, and subsidiary vessels, forming the first Soviet whaling expedition, have sailed for the Antarctic. The probability is, then, that whaling will steadily intensify and will not be long in surpassing its old fishing power.

The technique of modern pelagic whaling was developed during the twenty years before the war. Until about 1920 whaling in the Antarctic was carried on from shore stations or from old cargo ships, converted for use as whaling factories, anchored in suitable harbours. In those days, therefore, only whales which came within the steaming radius of the catchers could be taken, and only those harbours which lay on the migration routes of the whale herds were of any use as bases for whaling operations.

The pelagic system of whaling involves the use of big ships, in many cases of over 20,000 tons gross, often specially built for the purpose. They combine the functions of whaling factory and tanker. Each is the mother ship of a fleet of catchers, now limited to seven in number but at one time numbering ten or fifteen. The catchers hunt continuously day and night, pausing only to re-fuel and take in provisions and ammunition. They bring the carcasses back one after another to the mother ship where they are hauled up a slipway in the stern, cut up on deck and boiled down in boilers below the decks. The oil is stored in tanks on board. The advantages of this system are obvious. The mother ship is free to move up and down the edge of the pack ice, following the movements of the whale herds. No restrictions of ice or failing daylight worry her. The whole ship is self-contained, with all the machinery and equipment on board, so that nothing needs to be specially shipped out from Europe, and the men, recruited in home ports, usually do not leave the ship until the longed for and joyous pay-off one spring day in Sandefjord or Tønsberg, or it may be Leith or Newcastle.

Yet certain factors do still limit the operations of the whalers. The open ocean along the pack ice edge is a region of frequent gales and fogs, which may make it impossible for the catchers to work for several days at a time. The cause of these fogs, which invariably accompany northerly winds, is the cooling of relatively warm air by the cold sea surface. This type of fog lies over the sea surface like a blanket and is usually limited in vertical extent to a hundred feet or so. In horizontal extent such fogs may stretch for scores of miles and in them visibility is reduced to a hundred yards or less. Such conditions are particularly hazardous to the factory ships because of the risk of collision with icebergs or large floes. The larger bergs move in the direction of the ocean drift currents, whereas the ship, when stopped, tends rather to drift with the wind. Moreover, large bergs frequently have an underwater shelf of ice which is of much greater



W. J. McCarthy

The Southern Venture. All factory ships are built on essentially the same pattern. A stern slipway leads up to the "plan" deck where the whales are dismembered. Deck houses and casings are displaced to the side, the twin funnels stand on either side of the deck and the masts are mounted on gantries

extent than the portion of ice which is visible above the surface. For this reason it is customary to give icebergs a wide berth.

As can be imagined, radar has proved to be an invaluable aid to navigation under foggy conditions. Large bergs can be detected at about thirty miles and small ice floes at up to five miles. This virtually removes all risk of collision and enables the factory ship to steam at normal speed in fog.

Hitherto the whalers have always relied, as they did in the old whaling days of Moby Dick, on the sharpness of their eyes to tell them where the whales are and on that sixth sense on which they pride themselves. The whale catchers are small ships of about 180 tons gross, armed with a harpoon gun mounted upon a platform in the bows. In a barrel at the masthead a man is posted as look-out. He sweeps the sea tirelessly with practised eyes from his giddy and swaying perch. The great whales spend all their lives at sea many hundreds of miles from any land but, since they are mammals, they must come to the surface to breathe air. It is then that they give themselves away for they throw up at each exhalation a high fountain of spray called

the "spout". It consists of condensed water vapour, sea water and possibly a certain amount of mucus. Far off in the distance, ten or fifteen miles away, the keen eyes of the look-out in the barrel can see the tell-tale puff of white like steam upon the sky-line. At a lesser distance the look-out can tell what kind of a whale he is chasing from the shape of the spout. The Blue whale, the largest and the most important of the Antarctic whales, throws up a rather bushy fountain while the smaller Fin whale, which travels about in larger schools than the Blue and is on the whole more abundant, makes a high thin spout with a rounded top. The Sperm whale, with only one nostril, makes a forwardly directed single puff of spray. But now science has come to the aid of the whaler, supplementing his sharp eyes and his sixth sense, in the business of spotting his prey.

It has been customary in the past, at the beginning of the period of operations, to send out a single catcher to look for whales and inform the factory ship and other catchers by wireless. Since the catchers usually operate in an area with a radius of about 200 miles round the factory ship, this preliminary re-

connaissance may take the best part of a day to complete. The use of reconnaissance aircraft for this purpose is now being explored. During the current season two of the factory ships are carrying amphibious aircraft. In two or three hours one of these aircraft is able to make a far more thorough reconnaissance than a ship could do in a whole day. A very considerable saving of time may be expected to result from the use of these aircraft. The task of flying over the sea in these regions will call for an exceptional degree of skill and courage on the part of the pilots. Deterioration in weather conditions may be rapid, and is almost impossible to forecast; and the risk of damage to the aircraft on landing from even quite small pieces of floating ice is always present. In order to explore the practicability of using aircraft last season the *Empire Victory* carried a meteorological officer on loan from the Royal Navy to study flying conditions on the spot. His report indicated that air operations in the Antarctic were a practical proposition for a substantial fraction of the time, and accordingly the experiment is being made this season.

These aircraft, in addition to hunting for whales, can be of great value in finding sea lanes through the pack ice both for the factory ship and for the catchers, thereby saving valuable time.

When once the chase is on, the skill of the whaling gunner, who is also the captain of his little ship, consists in his ability to judge the whale's movements beforehand. When the whale, like a wild horse scenting danger, begins to circle and dodge, the skilful gunner knows where his prey will come up next. He must be able to manoeuvre his ship so as to be exactly behind the whale and within about twenty or thirty yards of it during the few brief seconds when it next breaks surface. Here, again, science can now supplement the gunner's skill.

Last season two of the catchers were equipped with asdic echosounding apparatus with which it was hoped to maintain contact with the whale while submerged. A whale is capable of swimming under water at about fifteen knots and can remain submerged for about fifteen minutes, and can

thus easily escape in poor visibility. Last year's trials with asdic were inconclusive, but they are to continue during the current season. It seems likely that the equipment will require modification before it can be used effectively for following whales. For one thing they are far more manoeuvrable than a submarine, as well as being smaller, and for another, they are bound to reveal their presence at frequent intervals, so that asdic would only be of value in low visibility. It seems likely that some loss of accuracy in ranging could be accepted in return for a broader cone of search which would give the direction in which a "sounding" whale has headed.

The harpoon, the lethal weapon which deals the death blow to the whale, is a cast-iron spear about four feet long, muzzle-loaded into a gun about 4" bore and fired from it with a black powder charge. It has an explosive grenade screwed on to its head and operated by a time-fuse set off when the gun is fired.

The gun platform in the bows of a whale catcher. The harpoon is loaded in the gun. The first fifty fathoms or so of the harpoon line, the "forerunner", can be seen in front of the gun

Black Star





W. J. McCarthy

The harpoon, in flight, carrying out the harpoon line, about to strike between the whale's shoulder blades. It is aimed by the whaling gunner who is also captain of the whale catcher. (Right) A Fin whale, pumped up with air, being hauled up the stern slipway



W. J. McCarthy

The grenade explodes inside the whale, shattering the backbone if the harpoon has struck, as it should, behind the shoulder blades. Three barbs on the harpoon head, lashed down to the shaft before the gun is loaded, break their lashings when the head strikes the whale and project outwards, preventing the harpoon from tearing out of the wound. A long rope line is attached to the harpoon, running up over blocks upon the mast and down again into the hold where several thousand yards of it are coiled. When the whale has been hit he usually makes a very deep dive or "sounds", plunging headlong downwards, carrying out miles of harpoon line. Then he has to be played, when he comes to the surface again, like a gigantic fish with the mast as a fishing rod.

When at last he is dead he is pumped up with air so that his carcass floats with its slate-blue or black-and-white pleated belly upwards. His spreading tail flukes are cut off and he is towed back tail first alongside the

catcher to the factory ship. At the factory ship the whales lie moored to the stern, like floating balloons, awaiting their turn to be hauled up the sloping slipway one by one. A great iron claw, with a scissors joint, so that the greater the strain it bears the tighter it grips, is lowered down the slipway from a winch. The whale is skilfully manoeuvred in the water so that its tail lies within the gripping claws which then pull it slowly up the metal slope on to the wide deck above.

All factory ships are built on essentially the same pattern. There is an expanse of deck called the "plan" deck, which stretches from the bow to the stern slipway. All deck-housés and casings are displaced to the side in modern factory ships with bridges across the deck on which electric winches are conveniently placed for hauling on the multitude of criss-crossing wires that pull the carcasses asunder. The twin funnels stand on either side of the "plan" deck and the masts are mounted upon gantries so that there is a clear

run through from stern to stern.

The whales come to rest on the after part of the deck where the "flensers" get to work. They are very highly skilled men. Their job, and they have no other on the "plan", is to remove the blubber. This is a layer of firm white fat, three to nine inches thick, under the skin. It is the whale's coat. For the whale, since it is a mammal, is warm-blooded and must be insulated from the cold world in which it lives. But since it has lost all its hairs, except a few on the chin and the nose, it has developed a garment of fat which waxes and wanes in thickness according to the whale's condition. In the warm waters of the tropics the whales are thin, for not only have they no need of a protective covering but they also starve in northern waters during their winter breeding season. Along the southern pack ice, on the other hand, they feed throughout the summer and the layer of blubber is thick.

Every worker on the "plan" who has to cut blubber or meat uses a long-handled flensing knife with a wooden shaft about four feet long and a curved blade which he keeps sharp with a stone slung at his belt. He wears overalls and long, spiked leather thigh boots, for this is dirty and slippery work.

The carcass comes up on deck lying on its side. The flensers make three cuts through the blubber from the tail to the head, parting

the firm white coat with a crisp sound. One cut runs along the middle line of the whale's back and the other along his belly. The third runs up over his uppermost side, past the eye and along the lower jaw, separating the great loose mass of ribbed skin and connective tissue of the chin. An eye-hole is cut in each blubber strip at its forward end, a wire toggle is passed through it and attached to a wire from a winch. The winch then hauls the three strips back, pulling them up and backwards with a hard, rending, crackling noise, helped by the slashing action of the flensers' knives. The carcass is now rolled over so as to expose the strip of blubber on which it has been lying and this too is stripped off. Next the flensers pull off the lower jaw. When all the loose flabby flesh of the chin has been cut away, the great curved V of the jaw is pulled backwards and agape by a wire from one of the winches, while the flensers hack at the cushions of fibres by which it is slung from the cheek bones. It comes away quite cleanly and easily and is whisked away to another part of the "plan" to be cut up by steam saws. Four long strips of blubber are now lying on the deck, their clean white surfaces upwards. Now it is the turn of another gang, the "blubber cutters". They cut up the strips into dice. Others with hooks feed the dice, like slices of hard white cheese, on to a re-

A Blue whale on the "plan" deck, ready for "flensing", showing the claw which grips the tail and the steel hawsers for pulling the whale up the slipway. Fragments of a previous whale litter the deck

W. J. McCarthy





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A general view of the "plan" deck of a whaler. The whale has been "fensed" and is now being pulled forward to the fore part of the deck. The "lemmer" standing on the carcass is making a preliminary cut along the belly. On the left is one of the steam saws, with sections of a backbone which it has been cutting up. (Below) A "flenser" stripping the head. Note the whalebone plates through which the whale filters its food



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volving knife that thrashes round incessantly above the rattle of the winches. The dice pass through an aperture in the deck onto the knife, which cuts them into slivers, and thence they pass out of sight to the blubber boilers below. The blubber is treated separately and gives the best whale oil, a pure white liquid.

The carcass is now naked, stripped of its blubber and with the lower jaw removed, and you can see the rows of whalebone plates, fringing the upper jaw, which form a sort of sieve through which the whale filters the vast shoals of shrimps or "krill" which are its only food. Next, the head is removed and, like the lower jaw, whisked away to the steam saws. The flensers have now finished with this whale and hand it over to the "lemmers" who carry out the actual dismemberment. They too work with long-handled flensing knives. Their plan of operations is to pull the ribs and entrails away from the backbone and all the muscles attached to it. The truncated whale is now lying on the side opposite to that on which it was hauled up the slip. A wire keeps a strain on the upper flipper while one

of the lemmers, with great strength and skill and a considerable knowledge of anatomy born of long practice, detaches the uppermost row of ribs from the backbone. Another disarticulates them along the middle line and makes an opening in the belly. The winches pull away the upper roofing of the ribs and a long strip of muscle back to the tail and whirl them away to be reduced to manageable proportions. A lower basin of ribs remains, and these too are removed by disarticulating them from the backbone. Meanwhile the strips of red muscle along the back have been pulled off. In a young fresh whale this is the edible part and cubes of meat are cut from it to be carried off by the ship's butcher.

Now all that is left of the whale is the long vertebral column resting on two cushions of muscle underneath. It is turned over, the rest of the meat stripped off and it is hauled like a long train to the steam saws to be cut into sections small enough to be fed into the boilers. This, in fact, is all that remains to be done. The meat cutters wade about among the disordered shambles that now litters the "plan", cutting up the flesh with their long knives and dragging it with steel hooks to the open mouths of the boiler tops. But long before this the flensers have stripped another whale, handed it to the lemmers and begun to strip the white blubber from a third. So with a clangour and rattle the work goes on day and night, the whales passing up the slipway at the rate of perhaps twenty in twenty-four hours. It goes on for three months, from December to February, which is all the time allowed for the whaling season by international agreement.

Every part of the carcass is used, except the horny whalebone plates which are thrown overboard. The boilers are arranged below deck, the blubber boilers under the after deck and those for meat, guts and bone under the foredeck. As each boiler becomes full it is closed and clamped down. Steam is forced in under pressure and the boiler left to cook. The whale oil runs out at the outlet pipes and is carried to separators where it is separated from the water which is mixed with it. From the separators it runs to storage tanks. There is little left in the blubber boilers at the end of that time, but in the meat and bone boilers there remains a residue which is dried in rotating cylinders and used as artificial manure. In the most modern factories the boilers are of another type which can be fed and emptied continuously.

In the years immediately before the war there were between thirty and forty whaling factory ships operating every summer along



Removing the lower jaw. All the tissues of the tongue and chin have been removed and can be seen on the right. The whale is lying on its back

the ice edge. Each took about 1200 whales in a season—perhaps a total for the whole fleet of about 40,000 whales a year. The effects of this had begun to show themselves on the population of the best and most important kind of whales, the Blue whales. The average length of the Blue whales taken in the Antarctic was becoming smaller and the proportion of young and immature Blue whales in the catches was increasing. These are sure signs of over-fishing. It was one of the few triumphs of international cooperation, which shone in the darkness of the years before the war, when the nations engaged in whaling (except Japan) drew up in 1937 a set of rules for controlling and regulating the whale fishery in the Antarctic. These rules still stand and it is to be hoped that in the new attack, with all the resources of total war, which is about to be launched upon the whale herds, they will provide a necessary safeguard for these gentle and harmless monsters that are so important to mankind.

Air Photography and Geographical Research

by D. A. SPENCER

In our March and May 1946 numbers, Dr Spencer explained the latest developments in the equipment and materials available to geographers for black-and-white and colour photography respectively. His present subject is reviewed in the light of his war-time experience as Principal Scientific Officer in charge of research and development on photography at the Ministry of Aircraft Production

THAT aerial photographic reconnaissance would be an important source of information was recognized before the war, but few, even of those intimately concerned, realized before 1941 the remarkable results that could be obtained by a combination of first-class aerial photography with a thorough study of the resulting photographs by experts in many different fields working in close collaboration. The experience which has been gained is capable of direct application to many different branches of peace-time research. Indeed, much information of interest in this connection is probably potentially available in the many thousands of negatives already made by the Allied Air Forces. A desirable step towards making such records available to teachers and research workers has already been taken in Canada by the establishment of a National Photographic Library in which R.C.A.F. negatives are to be deposited. It is to be hoped that a similar library will be set up in England.

War experience has made the automatic air camera a very efficient and flexible instrument capable in its different forms of giving high definition records at all heights from 50 to 40,000 feet.

FILMS

Five basic types of film were employed for air photography during the war:

1. *Tri-X*. This was an extremely fast panchromatic emulsion employed for night photography and to a limited extent for reconnaissance under poor lighting conditions. Its remarkably high speed was inevitably accompanied by a fair amount of graininess, and the speed fell progressively after manufacture. By the time the film was a few months old it was little more than twice the speed of the standard Aero Pan. This special-purpose film, in its present form at all events, is not likely to have important

peace-time applications.

2. *Standard Aero Pan*. This was a high-speed panchromatic film closely resembling the familiar Super-XX, though with a higher sensitivity to red light—permitting short exposures through the colour filters invariably employed to minimize the veiling effect of atmospheric haze. Practically all daylight reconnaissance and record air photographs were made on this type of material through a yellow filter, and it will no doubt continue to be the standard peace-time type for air photography.

3. *Infra-Red Aero Film*. Shortly after the outbreak of war a high-speed infra-red film became available and it was possible to put to practical test the many advantages claimed for such a material. They proved to be largely illusory.

Infra-red film must be stored in refrigerators and used within a few months of manufacture if its working speed is to remain of the same order as the ordinary panchromatic aero film—a great disadvantage under conditions in which war-time reconnaissance had to operate. Moreover, the ability of infra-red photography to penetrate water vapour is usually much exaggerated in the popular press. Faced with any haze more substantial than heat haze, the penetrating power of photographically active infra-red rays is very little greater than visible light, and those conditions of haze or very light mist where infra-red photography shows to advantage were so rare that they could normally be ignored (see page 438). On the other hand, the fact that water absorbs infra-red makes waterlines, rivers, etc. very clearly distinguishable on aerial infra-red photographs. In addition, differentiation between, for example, dead and live vegetation is much clearer on such photographs. Normally such records are of maximum usefulness when they are compared with a similar photograph made on ordinary film



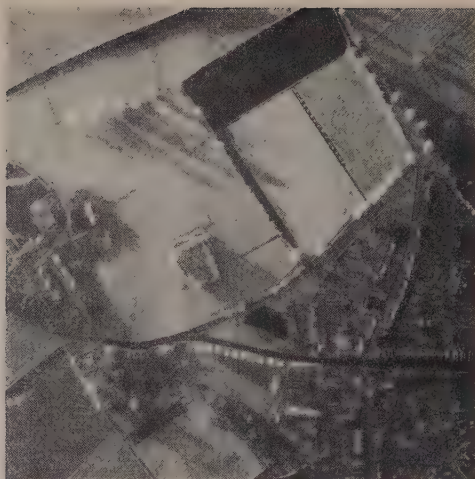
Bradford Washburn, by courtesy of Kodak Research Laboratories

As a preliminary to more laborious exploration and detailed mapping, air photographs provide the modern geographer with invaluable information. Mount McKinley, Alaska, taken from 16,000 feet

through yellow or green filters. It then becomes possible, for example, to distinguish between surface and underwater obstacles or vegetation (see page 439)—and generally speaking the two records will be found complementary in the sense that each emphasizes certain details suppressed in its comparison photograph. Under peace-time conditions it may well be therefore that there are specialized purposes for which infra-red photography will be valuable. If so, the conditions which must be observed for the best results are now well established.

4. *'Aero Reversal Kodacolor' Film.* This was an integral tripack film developed by Eastman Kodak for air use. Aero Reversal Kodacolor film can be reversal-processed in the field to yield a subtractive natural-colour transparency built up from yellow, magenta and blue-green dye images. The R.A.F. used this film primarily to record the coloured identification pattern of target indicators dropped by the Path-

finders during saturation raids on enemy towns. In the Pacific the American Air Force used Aero Reversal Kodacolor, primarily for beach reconnaissances. It was valuable in that it enabled underwater obstacles near beaches to be clearly recorded. It had the disadvantage that only one photograph, the positive transparency produced by the appropriate processing of the camera exposure, was easily available. It is, of course, possible to prepare a negative and black-and-white prints or even copy colour transparencies from the Aero Reversal Kodacolor, but this procedure is time-consuming and was not developed to any extent during the war. Finally, colour film is only of real value when exposed from fairly low altitudes. At high altitudes all the colours in the landscape become desaturated and the colour record shows little advantage over black and white. Colour film of this type will, however, be of considerably greater value to peace-time



Crown Copyright



Infra-red air photography is of value in penetrating heavy ground haze, as here shown, but not fog or cloud. Comparison photographs taken on (left) infra-red and (right) service panchromatic film

aerial photography where low-altitude work is feasible, the urgency in producing duplicates is less, and in particular when the photographs must be interpreted by those with limited experience in this field.

5. *Camouflage Detection Film.* This was a modified form of Aero Reversal Kodacolor Film in which one of the emulsion layers consisted of an infra-red emulsion and the three layers were processed in colours which were not necessarily complementary to their colour sensitivity. As a result, green grass, for example, might appear magenta in the colour transparency and features in the landscape which in a normal colour photograph might escape detection could often be clearly differentiated in the camouflage film. Such material has potential peace-time applications, but further field trials will be necessary to determine its real value in such fields as forestry, archaeology and prospecting from the air (see page 445).

PROCESSING

War experience eventually confirmed what the photographic scientists had been telling us for years—namely, that nothing was to be gained by trying to adjust processing conditions to correct for errors in exposure. A simple form of calculator was devised which showed the correct exposure for air photography at any place on the earth at any time of the day, and standardized processing of the negative then gave the best attainable result. Processing equipment ranging from spiral type racks to fully automatic continuous pro-

cessing machines ultimately enabled any length of film from a few feet to 250 ft. lengths to be developed by rule rather than inspection.

INTERPRETATION

There are two main types of aerial photograph—the oblique, that is, the pictorial or bird's-eye view made through the side of the aircraft, and the vertical taken through the floor, producing a photograph of the ground as on a plan.

Although to the untrained observer the oblique presents the more familiar view, the scale varies from foreground to background and there is much 'dead' ground in hilly or wooded regions. Vertical photographs with scales ranging from less than $1/16,000$ to more than $1/10,000$ were of much greater use to our interpreters, although those below $1/20,000$ were often too small for closely detailed work.

Such photographs are not pictures in the conventional sense but rather a mosaic collection of details whose meaning is not immediately obvious. The amount of information which an interpreter can extract is directly proportional to his experience. This in turn is dependent on his full understanding of air photographs as a source of information, his knowledge of the subject being studied and his having access to a series of photographs of the same area made on earlier occasions. He is immeasurably helped by the fact that the photographs can be viewed stereoscopically—that is, the picture appears to be a visual model in three dimensions. A right and left

eye record is necessary for a scene to appear in relief, and the amount of this relief is determined by the distance apart of the two viewpoints. When we examine a scene with our eyes, which are only about a couple of inches apart, all sensation of relief disappears when objects are more than 500 feet away. But the interpreter examines the landscape as though he were a giant with eyes several hundred yards apart merely by placing in his stereoscope a pair of prints from the series of overlapping records which the detached eye of the flying camera has provided.

Each pair of photographs was studied by specialists in many different fields, supplying its quota of information to each. By 1943 we had compiled what was virtually a photographic Lloyd's register of enemy shipping and we had learned to tell the type of cargoes and probable destination of every enemy ship that mattered. We followed every important aspect of German industrial activity and were able to calculate with remarkable accuracy the month-by-month output of the more important factories. We watched Germany's progress in research on radar and atomic bombs. Photographic intelligence revealed enough information about the development of the flying bomb in time for us to make such preparations as were possible

to reduce the attacks from a major disaster to a nuisance of no effect on the outcome of the war. Meanwhile, we were accumulating via the air camera essential information on every aspect of the Normandy coast and landscape which would facilitate invasion.

FUTURE APPLICATIONS

We have accumulated, then, considerable experience with a powerful tool of research, and it remains for us to adapt it to the sane requirements of peace. The British Ecological Society has taken a first step by circulating to scientific authorities and responsible government departments a memorandum recommending the establishment of an aerial unit for scientific work. Such a unit would form an invaluable focal point for researches in many fields, of which those most interesting to geographers would include the following:

Mapping

Even in Britain, probably the best-mapped country in the world, those engaged in geological investigation of the upland areas find their work restricted by the lack of detailed topographical maps. Fortunately, the great importance of air photography in mapping is well understood and the assistance such



By courtesy of Majors P. K. Wiggs, P. E. Conant and the Army Photographic Research Unit

Infra-red rays are in fact absorbed by water; advantage can be gained from this in, for example, the detection of commercially valuable seaweeds. A photograph taken on ordinary film with a green filter (left) shows both a belt of, probably, rock weed (B) and a belt of bottom weed (C). This underwater belt is invisible on an infra-red photograph (right) where, however, belt (B) appears very bright because of its high reflectivity in deep red light and is clearly distinguished from bare rock (A) and sand or shingle, which appear dark. Thus the two photographs supplement each other



photographs will bring to other sciences may well be an important by-product of the extensive air surveys already planned. Here again, the war forced the Allies to investigate simultaneously the value of different air mapping techniques, and there is now a wealth of experience available as to the relative value of different systems for particular assignments and budgets.

The speed and convenience of aerial mapping has long been admitted, and for inaccessible or difficult country such as the jungles and swamps of Africa it is invaluable. Its accuracy, however, left something to be desired. As a result of war experience it can safely be claimed that any required degree of accuracy is now attainable. In some cases this accuracy exceeds that of conventional ground surveying, while the improved techniques available should result in appreciable saving in cost. These include navigation of the aircraft and automatic operation of the cameras by radar control devices at the ground station.

Prior to the introduction of this form of control very wasteful overlapping of the records was necessary to avoid gaps in the photographic coverage. Radar control makes it possible to fill in any gap in an earlier series of photographs, caused for example by a cloud below the aircraft, by directing the plane to the exact spot and operating the camera at the correct instant. The pilot's responsibility is reduced to keeping his machine flying at the specified height, its navigation and the camera operation being carried out for him from his ground station.

The aerial camera in effect brings the territory to be mapped to the surveyor's laboratory for measurement. For maximum accuracy, careful handling of specially designed films and printing material is necessary. A distortionless film—so-called topographic—is used in the camera, and after processing under conditions which will not introduce distortion, the film is conditioned in the atmosphere in which it is to be printed, the prints being made on sensitized aluminium foil or on photographic paper rendered distortion-free by a metal lamination.

It is evident that photographs made

One-third of an air survey photograph which includes 80 square miles of land in one exposure. It was taken with the R.A.F. Radar-controlled F.66 Air Survey Camera from 30,000 feet. Despite the small scale, details are remarkably clear: if any are obscured, the defect can be remedied by radar control, which directs an aircraft to the exact spot and operates the camera.

primarily for mapping purposes will record a mass of data of interest to research workers in other fields, and to all those concerned with such economic and administrative questions as land utilization, agriculture, mining, town planning, electricity, water and transport services. In many cases, however, special flights at particular seasons and times of the day will be necessary if air photography is to contribute fully to developments in certain fields, one of which is archaeology.

Archaeology

Archaeologists were made aware through the pioneer work of Crawford, Kieller and Insall of the value of the point of view given by the aeroplane, and many important sites were discovered by its use. The disturbance of the soil by ancient, filled-in earthworks brings about subtle changes in the vegetation grown on it. These 'crop markings' are rarely significant at ground level and from the air can only be seen with certain crops at certain stages of their growth under certain lighting conditions. It will clearly be a matter of chance whether such crop markings will be recorded on air photographs made for other purposes, and for the best results specially arranged flights under the direction of an archaeologist must be made over areas known to be of interest, at appropriate seasons and times.

Ecology

Ecologists, concerned as they are with what might be termed biological geography, have already used air photographic surveys of South America to provide data on the density and distribution of population, distribution of arable land, natural barriers and natural avenues of travel, sources of power, fuel and water, land utilization, facilities for transport and the influence of topography on the location of roads and towns. Such investigations are closely related to the sort of studies we have made of Germany since 1939, and the methods so successfully applied to ferreting out the activities of our human enemies are also applicable to non-human pests—animal and vegetable! The control of such disease-carrying insects as the mosquito and the tsetse fly by spraying from the air is now

R.C.A.F. photograph of Camsell Bend, District of Mackenzie, N.W.T., taken from horizon to horizon at 10,000 feet in simultaneous exposures by three cameras (one oblique, vertical and right oblique). A topographical map issued in Canada in 1945, based on a series of such photographs, is believed to be the first to be made using this 'Trimetrogon' technique

By courtesy of R.C.A.F.



familiar. More indirect methods of control may well emerge from studies of bird migration and population (particularly upon inaccessible islands) made with the air camera; and air surveys should be a very convenient method of checking the efficiency of our attacks on such pests as the boll-weevil or the Colorado Beetle.

Ecologists studying such problems as the advance of bracken over grass-land or of prickly pear in Australia and the distribution and effect on each other of plant communities (woodlands, jungles, prairies) are already using monochrome air photography effectively. Here, both infra-red and colour film may well come into their own. Colour film, particularly of the camouflage detection type described above, might prove invaluable in forest surveys to determine when gum trees, for example, were in the resting period by recording unmistakably the characteristic change in hue of the foliage. Infra-red film would be useful in differentiating between live (chlorophyll-containing) and dead vegetation, between marsh or swamps and firm ground, and has already been applied to the discovery of commercially valuable seaweeds (see page 439).

Colour Filter Techniques

As an alternative to the use of colour or infra-red film for such purposes, a promising line of research partially developed during the war is to use panchromatic film in two separate cameras, each filtered with an

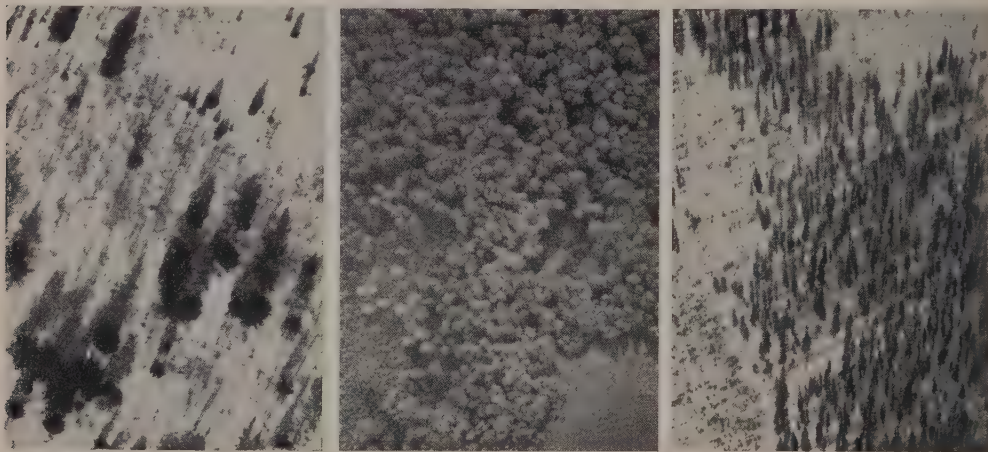
appropriate colour filter. This technique was applied to the determination of the depths of off-shore water by density measurements made on negatives taken through red and green filters. Red light is more rapidly absorbed than green light during the passage through greenish sea water, and the relative density of the sea bed as recorded in the two photographs is therefore related to the thickness of the overlying water. Under favourable conditions, depths up to 40 feet have been determined with acceptable accuracy by this method.

Oceanography

This technique should be of interest to marine biologists making surveys of animal communities or seaweed concentrations. When sufficiently refined it has been suggested that the method might even be used for distinguishing between the differing bodies of sea water whose movements determine the movements of fish shoals. The shoals themselves could almost certainly be detected by appropriate forms of reconnaissance photography—an innovation which might have great economic importance.

Forestry

Records for the purposes described must be made under carefully controlled conditions if they are to prove of real value, and the nature of the filters employed will change with the nature of the information required. Even qualitative filter techniques should, however,



By courtesy of R.C.A.F.

When access to forest areas is difficult, air photography is of great assistance to the forester. (Left) Tree species can be identified by shadow (Petawawa Forest Experiment Station, Ontario). The heights of trees can be determined with the aid of trigonometry by measuring their images in (centre) a vertical photograph (British Columbia) or (right) an oblique photograph (Alberta)



By courtesy of R.C.A.F.

Air photography is almost the only method of tracing the full extent and progress of a forest fire, when (as seen above near Campbellton, New Brunswick) it is split up and spreading over a wide area

greatly facilitate forestry surveys of the type made by Dr Lindquist of Lund. Choosing a season when the beech foliage contrasted with that of other trees, he was able to make a complete survey of the beech forests through southern Sweden. By using as one of the pairs of filters a green, whose main transmission is in the spectral region most strongly reflected by the trees being inventoried, such surveys might be simplified since relatively subtle colour differences could be exaggerated in the photographs. Canadian foresters, from aerial photographic surveys of forest land, have obtained, in addition to such data as the types and density of trees, details of their composition, age and structure which are of great value in forest management. These surveys are also used in fire control planning, the re-location of Canadian highways and the planning of new ones.

It has, in fact, proved easier than might be expected to distinguish between different types of vegetation in air photographs. Moreover, in some regions vegetation is zoned with respect to elevation, inclination of slopes, proximity of water and rock outcrops, and hence provides a guide to the interpretation of topographic features, some of which—such

as the site of old beaches—are obscure on the ground.

Geology

Changes in vegetation over a period of time are often associated with important topographic processes, and as the surveys spread to such vegetation types as sphagnum bog or submerged seaweed beds, they impinge on the interests of geologists, for they yield indirect data on such problems as the silting of estuaries, coast erosion and other factors controlling the development of scenery.

The geologist is, in any event, already aware of the value of air photography in simplifying his studies of geological structure and land forms. As an example, the size, shape, distribution and evolution of complexes of sand dunes is much easier to assess from the air. Air photographs made for such purposes will in turn facilitate the work of the prospector for mineral deposits, and the mining engineer (see page 444).

In Britain, the value of prospecting by air is limited by the extensive drift covering. However, air photographs enable the British geologist to locate his exact position in featureless moorland and help an understanding of



By courtesy of Wing Com. Pearce, Dr A. W. Jolliffe, and the R.C.A.F.
Aeroprospecting. The bands of white quartzite and grey sedimentaries show up well on this photograph of the Belcher Islands, Hudson Bay. From such aerial photographs, the geomorphologist can see the run of rock strata immediately and thus determine the likeliest areas for field prospecting

geological structure, while the value of a library of air photographs for teaching geology is world-wide.

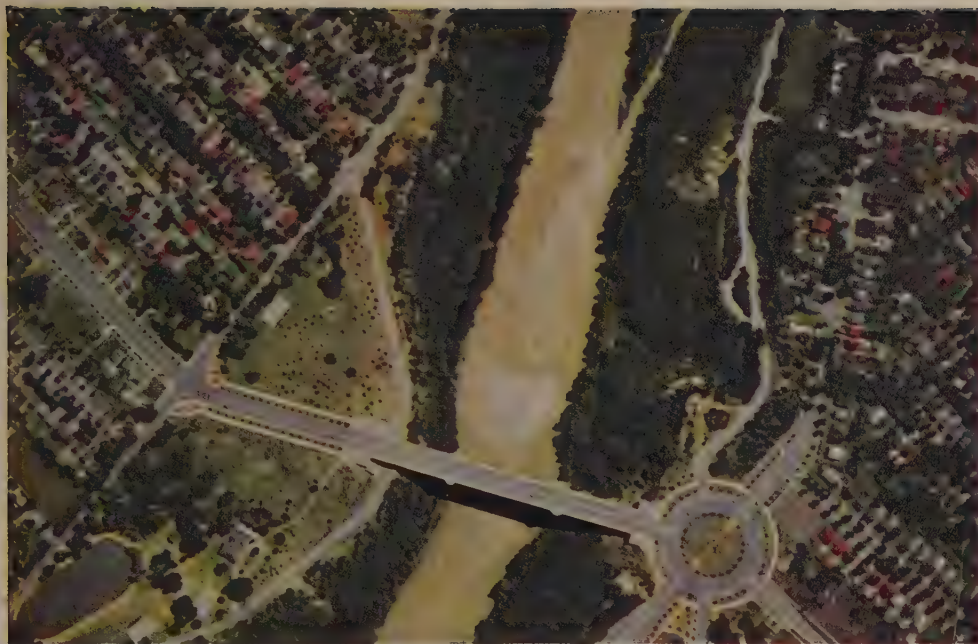
Soil Erosion

Already over 50 per cent of the continental U.S. has been photographed from the air to enable the Soil Conservation Service of Washington, D.C., to compile an inventory of the physical land factors involved in soil erosion. These photographs are used to determine soil type, land slope gradient, present use and degree of erosion. The records not only provide a factual bird's-eye view of the land and its present condition but will be most useful in future years as a basis for comparing land conditions from time to time and for following trends in land use. The acreage of crops and other vegetation can be determined very rapidly and economically by colouring the photographic prints according to the crop, cutting up the prints and weighing the collection of various-shaped pieces of any one colour. The area can be determined from this weight with an accuracy of 1 in 1000. Such photographs can also supply a basis for the making of payments to farmers for diverting acreages from soil-

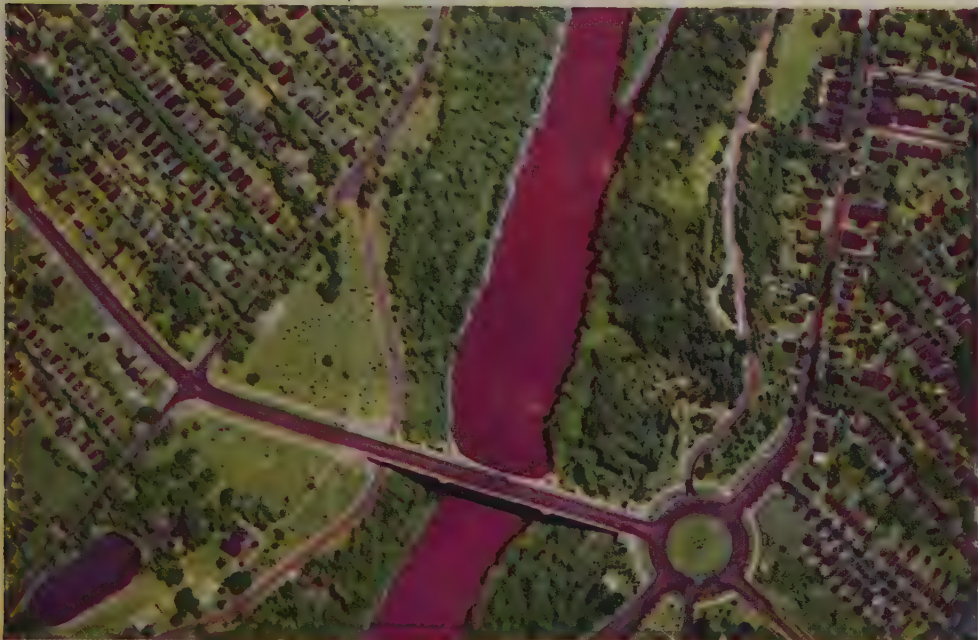
depleting to soil-conserving crops, and for carrying out approved soil-building practices.

There are of course many other peace-time applications of air photography which are less directly of interest to geographers, but enough has probably been said to make it clear that any scheme for the establishment of a scientific air photographic unit should have their support. Nor should such a unit be concerned merely with applying technical methods initiated by others; it should itself be able to promote fresh technical developments. For although the purely photographic procedures, once they have been established, may well be reduced to a routine, the development of new and specialized procedures will continue to be needed as facilities for air photography become more generally available to workers in many different fields.

Future development of air reconnaissance for military purposes is likely to be immediately concerned with the use of new types of aircraft and with improvements in the technique of photography and interpretation. Such development would be most valuably stimulated by work for civilian purposes under the variety of conditions for which the scientific applications of air photography offer scope.



Aero Kodacolor



Kodak Camouflage Detection Film

Photographs by courtesy of Eastman Kodak and U.S.A.A.F. (Wright Field)

(Above) A normal Aero Kodacolor photograph reproduces colours as they are seen by the naked eye. (Below) Camouflage Detection Film, besides altering visual contrast relations of objects by altering their hues, reveals vividly certain artificial colours. For example, it shows clearly a small, magenta, rectangular object on the grass at the intersection of the two arrows. This is not detectable on the ordinary photograph because it was painted to the colour of the surrounding grass

Landscape with Figures

by PROFESSOR E. G. R. TAYLOR



British Council

Human hands fashioned out of the Black Mountains this pastoral landscape which focuses upon Llanthony Abbey

In her two preceding articles, published in our August and September 1946 numbers, Professor Taylor surveyed 'The Anatomy of Landscape, as laid bare by the geologist's scalpel, and The Landscape Clothed in the garb of nature'. She now completes her survey by reviewing some changes in man's attitude towards the landscape and assessing the results of his activities in transforming it

OUR forefathers believed (as indeed many people do today) that all natural things, animate and inanimate, were individual creations planned and fashioned by a Divine Providence so that, down to the very last detail, they should serve the needs and pleasures of Man, the Lord of Creation. Grass was green and not red or yellow because green was the colour most restful to the eye. Tigers were fierce to incite men to valour. The products of countries were diverse in order to foster trade and navigation. It was because the Realm of Nature only found meaning in the person of Man that the landscape painter or the engraver always introduced into his composition, however obscurely, some human group. He portrayed a Landscape with Figures. Little wonder that the wild and

solitary places of the earth, the trackless forests, and especially the precipitous mountains (which spell adventure and romance to modern youth), were long regarded with dislike and dread, their beauties unperceived. When Sir Walter Raleigh praised the virgin landscape of Guiana it was because he saw in its undulating grassy plains, handsomely spaced with trees and dotted with herds of browsing deer, an *ensemble* which recalled to him an English gentleman's park. To Shakespeare and his contemporaries any land was a "desert", no matter what its natural richness and beauty, if it had no human habitations or tilled fields.

Natural beauty, indeed, was scarcely conceived of except in pastoral terms: in terms, that is to say, of cultivated landscapes, breath-

ing a spirit of peace, security and plenty. "The hills that encompass it on both sides", wrote Camden of the Golden Valley, "are clothed with woods: under the woods lie corn-fields on each hand: and under those fields lovely and fruitful meadows. In the middle, between them, glides a clear and crystal river." And old Cobbett, writing two and a half centuries later, almost echoes the very words of his predecessor. For after making the forthright statement (suggested by the scenery of Snowdonia): "I have, for my part, no idea of picturesque beauty separate from fertility of soil", he went on to describe the landscape which he deemed "the brightest and most beautiful". It was in Wiltshire. "Smooth and verdant Downs in hills and valleys of endless variety as to height and shape; rich corn-land unencumbered by fences; meadows in due proportion, and these watered at pleasure; and lastly the homesteads and villages, sheltered in winter and shaded in summer by lofty and beautiful trees." Boswell found the wild Highland landscape con-

tinuously "dreary", and that Dr Johnson, too, linked beauty with fertility may be judged by his remark to a Scottish gentleman towards the close of his Hebridean Journey: "Your country consists of two things, stone and water. There is, indeed, a little earth above the stone in some places, but very little; and the stone is always appearing. It is like a man in rags; the naked skin is still peeping out."

The case against mountains, which he believed to be blots on the landscape, was formulated by Dr Burnet, in a widely read book, written towards the close of the 17th century. "These are placed in no order one with another, that can respect either Use or Beauty, and do not consist of any Proportion of Parts that is referable to any Design; or that hath at least footsteps of Art and Counsel." They formed, in fact, part of the "rude and unseemly" world that had emerged with the subsidence of the Flood, replacing the smooth and orderly antediluvian landscapes. Yet even as these words were being written, the new-born sciences of botany and geology were leading

A familiar, yet unfamiliar, view of the Grindelwald Valley. The artist's horror of mountains has led him to exaggerate the ruggedness of the peaks and to accentuate the Grand Glacier's crevasses

From J. J. Scheuchzer, "Itinera per Helvetiae Alpinas Regiones", 1723

Montagne nommée le grand GLETSCHER, dans le Grindelwald, en Suisse.





Kodachrome by Leslie F. Thompson

The June beauty of the Arun, flowing beneath the South Downs, is enhanced rather than diminished by the brilliant whiteness of the chalk scars on the face of the hills. Chalk quarries go back to very ancient times, for 'marling' was early found to improve our heavy, lime-deficient clays

men to travel about among the mountains with their eyes open, and hence many Fellows of the Royal Society were among the first to rally to the defence of "high places". "Even this very variety of Sea and Land, of Hill and Dale," wrote Dr John Woodward, "which is here reputed so inelegant and unbecoming, is indeed extremely charming and agreeable." And a fellow geologist, Dr Thomas Robinson, who rode about the Lake District viewing mines and interrogating miners, declared in his pompous parsonic style: "These high and lofty Mountains do not only contribute to the entertainment of our Visive Faculty with most curious and delightful Landskips, but present us with a Set of Vegetables peculiar to their cold and elevated Soil." The importance of mountains in respect of rainfall, springs and rivers had only recently been demonstrated by Edmund Halley, and when a Swiss physician and botanist undertook a series of systematic journeys through the Alps, the Royal Society,

led by Sir Isaac Newton, contributed to the heavy expense of illustrating his book with plates. One of these is here reproduced. That other plates depicted reported encounters with dragons and monstrous serpents, may surprise us until we remember that knowledge advances on a very uneven front. Sir Christopher Wren, returning home from the supervision of the workmen at St Paul's, hung a bag of lice round his wife's neck to cure her of an indisposition. We can split the atom, but we cannot get rid of a cold. Nevertheless, for several generations now, it has become the custom to admire wild nature, and Elizabeth Bennet, invited to accompany her uncle and aunt Gardiner to the Lakes, could exclaim: "Adieu to disappointment and spleen! What are men to rocks and mountains? Oh! what hours of transport we shall spend."

Man has set his impress even upon the mountains, upon the forests and the deserts,

and upon all the other wild places of the earth. Nothing is hidden from him any longer, and the dragons and unicorns, with all other fabulous monsters (except the sea-serpent), are banished for ever. That impress is cumulative and goes back over a million years or so. Man-made landscapes are more and more the rule, and that they can be beautiful no one will deny. What are the main changes that he has effected? Perhaps the most fundamental is his assault upon forests, an assault that commenced in earnest after what Professor Gordon Childe has termed the Neolithic Revolution, when farming began to be substituted for hunting as the way of life. Our fairy tales and folk tales have almost always the background of the forest which once lay all about the village clearing or the castle walls. Not until Queen Elizabeth's day did English people wake up to the fact that the clearing was now complete and timber supply a problem. The careful management and planting of woods and copses then became incumbent on every landowner, and such plantations are now an essential element of the beauty of the

rural scene. Because, however, the life-span of a tree greatly exceeds that of a man, and its rate of growth is correspondingly slow, it was necessary for the father to plant so that his son might enjoy. The disappearance, at an ever accelerating rate, of our landed gentry, and with them of the foresters and woodsmen whom they normally employed, has not been balanced, at any rate aesthetically, by the creation of a State Forestry Commission wedded to the production of dismal rows of conifers. Beauty is threatened here.

It is a melancholy fact that a forest, once destroyed, is not spontaneously reconstituted, even if subsequently left alone. The magnificent *sal* forests of India are increasingly replaced by grass jungle; the virgin forests of equatorial Africa have largely degenerated into bush, owing to the wasteful native practice of clearing fresh land for crops every three or four years and abandoning the old. In America, too, the lumberman has devastated thousands of square miles of finely timbered country, and then passed on, leaving behind him a wilderness. And with the forest must



Kodachrome by Ralph Foster

Fall colouring on the Gatineau River in Eastern Canada. Here the lumberman has unwittingly played the landscape architect, since by destroying the evergreen primeval coniferous forest he has encouraged maple, birch and other brilliantly coloured deciduous trees to spring up and replace it



Kodachrome by Ken Annakin

Open-cast coal-mining near Most in northern Czechoslovakia. Fields and trees are still visible in the background, but they only serve to emphasize the vast waste-land which man and his machinery are producing. The living soil is gone, and with it the graceful natural contours of the ground



Kodachrome by Ernst Schwitters

In Lakeland there are whole mountains of slate: never again will they be seen as they were in the far-off days "when Coniston Old Man was younger and his deep-quarried sides were stronger"



Courtesy of U.S. Soil Conservation Service

The smooth green surface of the earth may be gashed and torn by other agents than the mechanical navy. Once gullyng gets under way, whether started by over-grazing of pastures, or by unwise clearing of the ground for agriculture, it proceeds headlong. But ways to check it are now known

pass, of course, the birds and beasts that sheltered there, besides the hunting communities of men where these still survive. But the spoliation of forests has its most serious aspect where mountainous or hilly country is in question. The sequence of events may commence with the industrious farmer cutting down the trees, grubbing out the roots, ploughing the virgin soil. But rain has terrible power on a steep gradient. It tears away the soil from the unprotected slopes, carving a network of runnels which in time become gullies, and in time again deep canyons. The new fields are rendered worthless. But worse is to follow. The former gentle seepage of rainfall down-hill has become a torrential rush after each rainy spell. The water is so muddy that it kills the fish when it reaches the river, and the swollen river, unable to contain the sudden influx within its banks, floods the country far and wide, drowning cattle and threatening homes. Nor is this all. Soon it becomes apparent that malaria is on the increase, for the stagnant pools left behind by the floods prove ideal homes for the mosquito and its offspring. Over and over again, through the ages, and throughout the world, man has set this unhappy chain of events in motion, and it may not be the farmer, it may be the miner who

forges the first link, by destroying the forest to provide the fuel to smelt his ore.

Mining and quarrying represent the second of the great destructive activities of man in his character of transformer of the landscape. Mining, it is true, proceeds unseen, and the farmer may continue to plough above the miner's head. But not all that is brought up from the mine is pure mineral. Slag-heaps, tips and spoil-banks make a hideous scene of desolation for which we have yet to find a radical cure. Quarrying transforms the landscape in a more immediately obvious way, but quarrying within measure may add interest to the scene. The botanist, the bird-watcher, the geologist all love an old quarry or a brick-field, and the exposed surface of dazzling white chalk, of rust-red sandstone, or of creamy freestone can be very beautiful against a general background of green. But modern demands seem to require that nothing shall be done within measure. The very limestone that makes the most picturesque hills and dales, gorges and cliffs, is that which makes the most desirable cement and concrete! Everyone knows the eyesores created near Cheddar, near Buxton, and at Penmaenmawr for example, and it is at least some consolation to learn that the cement manufacturers them-



Kodachrome by F. Fisher

Enormous in scale compared to the men who designed it, yet in its turn dwarfed by the mountains, Boulder Dam has created, at a natural narrowing of a rocky gorge in the western United States, a new and beautiful mountain lake, which provides a mighty head of water for power and irrigation.

They have lately been foremost in fostering the new profession and school of Landscape Architecture which has as one of its objects the skilful healing or concealment of such scars upon the earth's face. Yet vital losses continue to occur. Dwellers in the Thames Valley above London can watch huge mechanical navvies grabbing great mouthfuls of soil and sub-soil from market-gardening land of the highest quality, on which fruit and vegetables are actually growing. Where "protective" foods were once produced a huge mere gradually comes into being, and thousands of tons of gravel go away to the builders. Must we continue to sacrifice spinach and strawberries if we want houses? To ask for control is (as experience daily teaches us) to court

deprivation. Yet to destroy rich soil is to rob our land for ever, and despoil our children.

But not all the picture is so gloomy. Man on the earth is a constructive as well as a destructive animal. With Camden and Cobbett we are all ready to praise the farming landscape, whether in England, or France, in Italy or elsewhere. The village and the country town, too, are a reminder that Man has in the past built beautifully, and they hold promise that he will one day build beautifully again. But it is in the control he has learned to exercise over water that his power to transform the landscape is most strikingly apparent. The draining of the Fens in the 17th century was second only to the gradual clearing of the forests in the changes it effected upon the



Aerofilms

The landscape of England that we know today is largely the work of 18th-century landowners such as the Dukes of Richmond, who laid out Goodwood. Here every coppice was sited with artistic intent. The great estates are passing: on us devolves the duty of creating like beauty for posterity

English scene. The undrained Fens must have been very like the great Pripet swamp in White Russia today. Wide sluggish streams winding among dense beds of reeds and rushes, and opening into broad meres. Islands large and small rising above water-level and yielding a precious store of hay. Water-alleys laboriously kept clear through the jungle of marsh vegetation along which the Fen-men upright in their flat-bottomed boats made their way to the scene of the day's work, to market or to church. An infinity of fish and variety of wild-fowl flourished, with eels and frogs and biting insects. There was a good living to be made from the Fens, and the projects for transforming the whole region into farm-land met with passionate protests from the inhabitants. The sober-minded presented petitions, the hot-headed organized repeated

rioting. But the end was the same. The rich peat and silt soils, fine and stoneless, stretching away dead-level to the unbroken horizon, today yield sugar and potatoes, corn and meat whose value must far outweigh, not merely the loss of fish and fowl and thatching reeds, but the loss of a fascinatingly strange scene and way of life. In a less spectacular fashion the "inning" of marsh-lands and warp-lands has gone on in many parts of the country—notably in Yorkshire, in Kent, in Sussex, but a careful survey shows that no less than 1,750,000 acres of the inland valleys and lowlands of England and Wales are still in urgent need of artificial drainage.

If in the wetter parts of the world the desirable transformation of the landscape is by drainage, in the drier parts, and in the parts that are seasonally dry it is by irrigation. The



by courtesy of U.S.I.S.

In contrast to the studied informality of the English 18th-century landscapists, illustrated on the previous page, are the patterns wrought by man on the earth's surface. In hilly country, he wisely follows its curves, producing similar effects whether he is (above) an American 'contour-ploughing' the slopes and planting belts of crops to combat erosion, or (opposite) a Javanese practising the age-old technique of rice-growing on irrigated terraces

The Aircraft Operating Company of Africa (Pty.) Limited





Elisbeth Huxley

...t country, on the other hand, tempts humanity to trace lines of geometrical straightness. The Dutchman, having
 ...ed (below) a slice of the North Sea floor to the Netherlands, celebrates his victory with neat and practical
 ...ughtsmanship. Here part of the problem was to contain an excess of water; but where, as (opposite) in South
 ...ica, the fruit-grower needs to conserve moisture on a sun-dried upland, the pattern is again one of formal regularity

By courtesy of K.L.M. Royal Dutch Airlines





John Markham

Take away the handiwork of man, and what would the significance of this landscape be?

earliest civilizations were based on State Planning of water control, for in Ancient Egypt as well as in Ancient Babylonia and Ancient India the reclamation of the pristine swamps and the construction of irrigation-channels were stupendous tasks demanding organized social cooperation, and breeding a strong sense of community. Today the enormous dams and barrages built by British engineers have in India alone brought an area equal in size to Great Britain under crop production, while similar works in Egypt, storing between seven and eight thousand million cubic metres of water, ensure that the seven lean years of the Bible story need never be repeated. A great irrigation dam, producing as it does an impression of strength and purpose, is in itself a magnificent sight, and those recently constructed in the western states of America have an added splendour, not only because of their setting amidst great gorges and mountains, but because they stand as witnesses of seem-

ingly insuperable obstacles met and conquered. Unplanned and haphazard building is always to be deplored, but those who regard a landscape as *ipso facto* ruined by the construction of a power-station, a factory or a viaduct, or indeed deplore any work of man, however carefully designed and subordinated to its surroundings, place themselves in the same category as those who once could perceive mountains only as wens and excrescences. Both are blinded by their preconceived notions. Every landscape gains in significance as it becomes a Landscape with Figures.

Stretch'd on a rising hill betwixt the strands,
London, her mother Troy's great rival stands;
Where heaven and earth their choicest gifts bestow,
And tides of men the spacious streets o'erflow.
London! the mighty image of our isle,
That we Great Britain of itself may style;
Where Chrysé, Paris, Rome, and Ormuz yield,
In metals, learning, people, wealth excell'd.

British Artists Abroad

I. Captain Cook's Draughtsmen

by GRAHAM REYNOLDS

MOST of us bring pictures back from our holidays, even if only a packet of postcard views or a roll of snapshots. Our pleasure has come in great part from the novelty of our surroundings, and we want to perpetuate the image of the foreign parts or seaside towns where we have felt the stimulating influence of unfamiliar scenes. Artists for at least a hundred years before the advent of photography have worked, with greater elegance, to meet the similar needs of their patrons and to show them too the aspect of the countries and towns they had not visited.

The present article, on the draughtsmen who accompanied Captain Cook on his voyages round the world, is the first of a series which will illustrate the work of British artists who went abroad in the days when to cross the Channel was a perilous adventure. We shall not necessarily be concerned with the greatest artists, for although all landscape painters are devoted to some *genius loci*, he may not live far from their front doors;

Constable was most attuned to the country of his birth, the Vale of Dedham. But all the artists with whom these articles will deal travelled with at least the average technical ability of their time, and some found their spiritual home in their travels—J. F. Lewis in Cairo, William Hodges in the Pacific, for example. Each generation has its own way of looking at nature, and we shall find in the 18th-century artist's vision of Italy or the Pacific Ocean, or the more full-bloodedly romantic response of the 19th-century topographers, an escape from the stale custom of our normal unimaginative photographs. In their works we can look at nature afresh through the eyes of quite another day than ours. If the painter transmits to us the sense of wonder we shall also learn how travel was a broadening experience for him; we shall understand how he has found fresh material for his imagination in foreign places, and how he has been inspired by new combinations of the world's inexhaustible colour and forms.

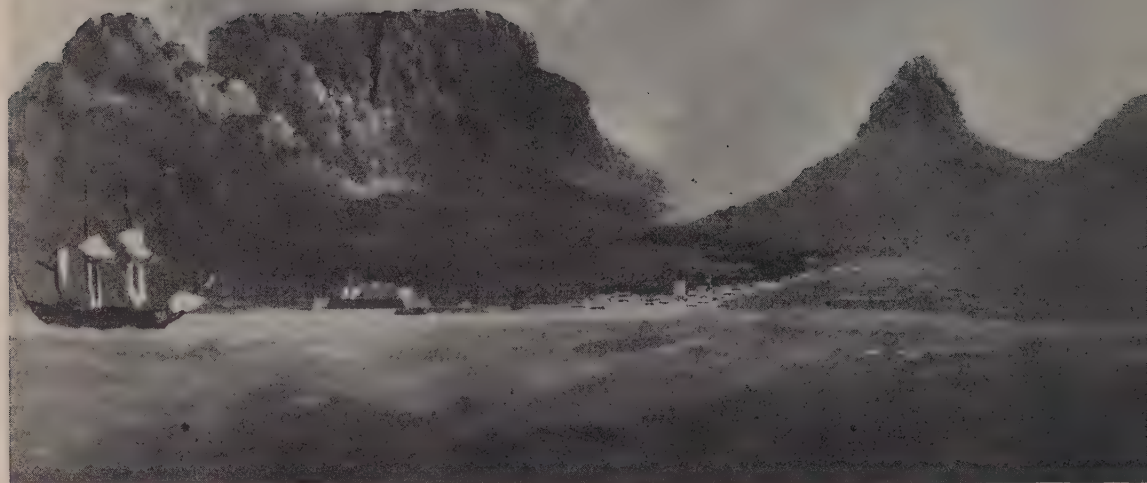
WILLIAM HODGES, R.A.

The purpose of Cook's three voyages round the world was discovery; and discovery meant not merely the charting of new continents and islands and their seizure in the King's name, but also the collection, as systematically and scientifically as possible, of any facts about them which might be interesting, relevant or useful. So, alongside the preparations for botanical and ethnological research, provision was made for an artistic record of the new lands. The Admiralty were explicit about this in their secret instructions for the first voyage. "You are also carefully to observe the nature of the soil and the products thereof, the beasts and fowls that inhabit or frequent it, the fishes that are to be found in the rivers or upon the coast and in what plenty . . . you are likewise to observe the genius, temper, disposition and number of the natives . . . you will also observe with accuracy the situation of such islands as you may discover in the course of your voyage . . . and make surveys and draughts of such of them as may appear to be of consequence."

The landscape artist who travelled on the first voyage was a Mr Buchan—a member of

Banks' *entourage*; but he died of epilepsy at Tahiti (Otaheite) and has remained virtually unknown. "On the 17th, early in the morning, we had the misfortune to lose Mr Buchan, the person whom Mr Banks had brought out as a painter of landscapes and figures. He was a sober, diligent, and ingenious young man, and deeply regretted by Mr Banks: who hoped by this means to have gratified his friends in England with representations of this country and its inhabitants, which no other person on board could delineate with the same accuracy and elegance." Banks, later to become Sir Joseph Banks, President of the Royal Society, was laying the foundations of his greatness as a naturalist by collecting specimens and drawing on this voyage.

Banks had also intended to accompany Cook on his second voyage (1772-5), taking with him Zoffany and three assistant draughtsmen; but considerations of naval architecture prevailed, and Banks with his party stayed behind. It was left to the Admiralty to choose their man. "The Admiralty showed no less attention to science in general", wrote



From original painting in the National Maritime Museum

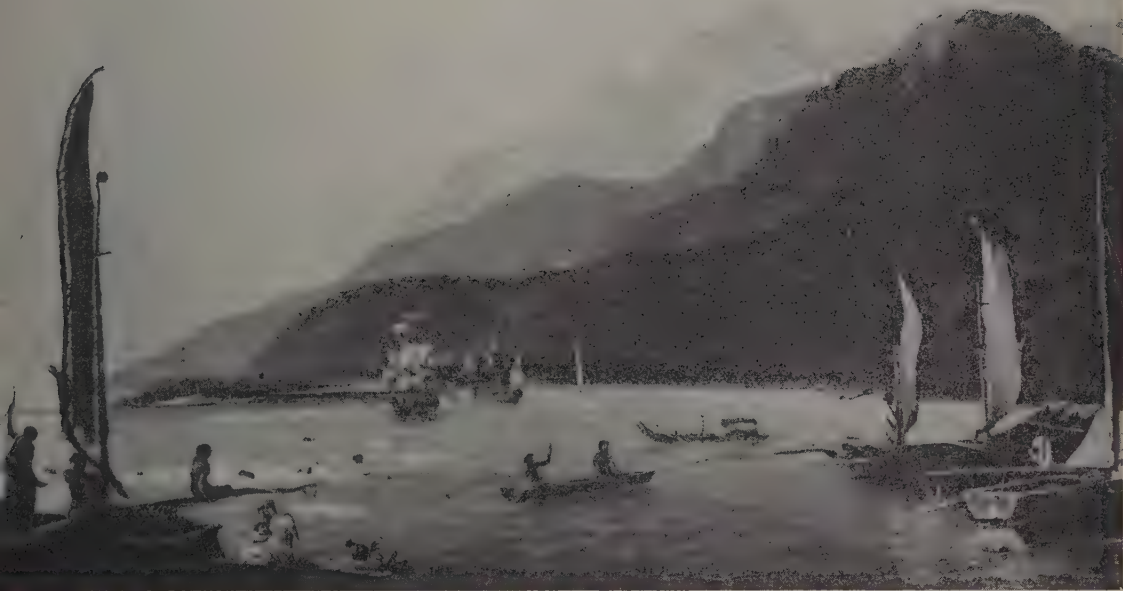
Cape Town: a painting made by William Hodges when Cook's ship Resolution anchored there in November 1772. It emphasizes the grandeur of the great peaks towering over the little Dutch settlement

Cook, "by engaging Mr William Hodges, a Landscape Painter, to embark on this voyage, in order to make drawings and paintings of such places in the countries we should touch at, as might be proper to give a more perfect idea thereof, than could be formed from written descriptions only." Constantly throughout the tour we hear of Cook taking Hodges with him to draw the scenery, and can see him looking over his shoulder and approving his work.

Indeed the Admiralty can hardly have known how wisely they had chosen; there was something in Hodges that responded to the East. He was twenty-eight at the time, and had been an assistant in the studio of Richard Wilson, the greatest landscape painter of his time though unrecognized as such. Contemporary gossip accused Wilson, in his miserable shifts to make a living, of selling the work of his assistants Hodges and Farington for his own; but be that as it may, he had certainly given his pupil the grounding he needed to rise to the great opportunity now put before

him. Wilson's eyes had been opened and his imagination inflamed by the grandeur of Italian scenery and its subtle gradations of atmosphere. He knew better than anyone living how to express the height and solidity of hills, so that the receptive onlooker could feel from his landscapes the impression of their size and their recession into the atmosphere; and Hodges had learned this power from his master. If, too, he had derived an unsuitable formula of figure drawing, so that the natives in his pictures look like the idealized Greeks and Romans of mythological painting, that at least did not disqualify him from his main task.

The paintings Hodges brought back from, or built up after, his voyage with Cook show how he was fired by the gorgeousness and the romance of Polynesia. In spite of their luxurious colouring, their drawing and composition alone are so powerful and imbued with their subject that these designs lose little at the hands of the excellent engravers who made prints out of them. Cook's journal of



From original painting in the National Maritime Museum

Resolution and Adventure in Matavia Bay. A painting by William Hodges of the scene in Tahiti when Cook's ships lay there in August 1773 amid the manifold enchantments of the South Sea islands

his voyage is as thrilling as any schoolboy's tale of the South Seas, and the official publication on the second voyage is immeasurably superior to any adventure story through its authentic illustrations alone.

The first distant port of call on this voyage was Cape Town, then a Dutch dependency. Cook records that "Mr Hodges employed himself here in drawing a view of the Cape, town, and parts adjacent, in oil colours; which was properly packed up, with some others, and left with Mr Brandt, in order to be forwarded to the Admiralty by the first ship that should sail for England". The resulting picture is most dramatic and gives impressive emphasis to the great peaks, Table Mountain, Devil's Peak and Lion's Head, which overhang and dwarf the little settlement clinging precariously to their roots.

We next hear of Hodges drawing views of Dusky Bay, New Zealand; but the port of call he was waiting anxiously to see was Tahiti. Cook, tongue-tied old sea-dog as he was, did in his last voyage attempt to sum up his own

response to the Earthly Paradise. "Perhaps, there is scarcely a spot in the universe that affords a more luxuriant prospect than the South East part of Otaheite. The hills are high and steep; and, in many places, craggy. But they are covered to the very summits with trees and shrubs, in such a manner, that the spectator can scarcely help thinking, that the very rocks possess the property of producing and supporting their verdant clothing. The flat land which bounds those hills toward the sea, and the interjacent valleys also, teem with various productions that grow with the most exuberant vigour; and, at once, fill the mind of the beholder with the idea, that no place on earth can outdo this, in the strength and beauty of vegetation. Nature has been no less liberal in distributing rivulets, which are found in every valley; and as they approach the sea, often divide into two or three branches, fertilizing the flat lands through which they run. The habitations of the natives are scattered, without order, upon these flats; and many of them appearing



From original painting in the National Maritime Museum

Review of War Galleys: a painting by William Hodges of the scene witnessed by Cook in 1774 when the fleet of Otaheite (Tahiti) assembled at Oparee in a trial mobilization before going to war

toward the shore, presented a delightful scene, viewed from our ships; especially as the sea; within the reef, which bounds the coast, is perfectly still, and affords a safe navigation, at all times, for the inhabitants; who are often seen paddling in their canoes indolently along, in passing from place to place, or in going to fish. On viewing these charming scenes, I have often regretted my inability to transmit to those who have had no opportunity of seeing them, such a description as might, in some measure, convey an impression similar to what must be felt by everyone who has been fortunate enough to be on the spot."

That impression of ineffable romance, of Calypso's enchanted isle and *la nouvelle Cythère*, is conveyed in Hodges' great paintings, "Matavia Bay" and "Tahiti Revisited". Only there and in the work of Gauguin can we find any pictorial equivalent to the glowing prose so many have written about Tahiti. And to excellence of composition and brilliance of colouring Hodges has added a breadth and gaiety in the brushwork which reveals his own excitement in the task.

As the voyage wore on its three years' term—often enough wearisome, no doubt—Hodges showed that he could respond to quite different places and other types of scenery. Strange tree-forms in the Isle of Pines and the mystery of Easter Island were equally within his compass. His representa-

tion of Easter Island is indeed of surpassing interest as one of the first attempts in European art to come to grips with a type of sculpture which was then well beyond its ken. We are so familiar with the statues from this island which flank the entrance to the British Museum that we can easily find fault with Hodges' rendering of the form; but when we make full allowances for the current lack of sympathy for anything not strictly classical we must agree that his is a surprisingly successful impression of an alien style. Cook's journal gives his explanation of the skull lying below the sinister images. "The gigantic statues, so often mentioned, are not, in my opinion, looked upon as idols by the present inhabitants, whatever they may have been in the days of the Dutch; at least I saw nothing that could induce me to think so. On the contrary, I rather suppose that they are burying-places for certain tribes or families. I, as well as some others, saw a human skeleton lying in one of the platforms, just covered with stones."

So, as the voyagers sailed on to Mallicollo, Tanna, the Island of Pines, back to New Zealand, on to the wastes of Christmas Sound in Tierra del Fuego and finally back to Cape Town, Hodges recorded, adaptably and responsively, all the strange fresh scenes which passed before their eyes. He was even able to make a drawing of a trial mobilization of the Tahitian war fleet at Oparee. And his work found favour. Cook was no art critic,



From original painting in the National Maritime Museum

Above) "Tahiti Revisited" by William Hodges. In this painting the artist has most completely conveyed the romance his English eyes found in the exotic scene. (Below) When Cook put in at Easter Island in March 1774, Hodges made this painting of the mysterious statues whose origin and purpose has been a constant source of surmise



From original painting in the National Maritime Museum



VIEW IN THE ISLAND OF PINE'S.

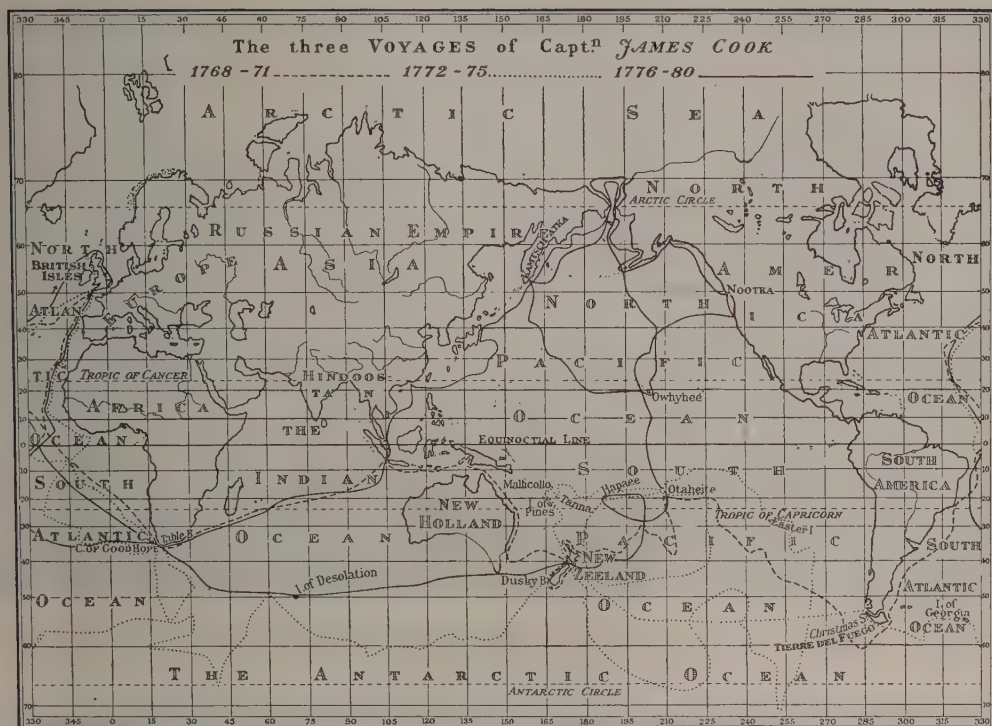
From the print in the Victoria & Albert Museum

Prints from the journal of Cook's Second Voyage showing how little Hodges' designs lose at the engravers' hands



A TOUPAPOW WITH A CORPSE ON IT
Accompanied by the Chief, Mowee in his habit of C...

From the print in the Victoria & Albert Museum



but it was on judgments such as his that an artist's reputation rested in the 18th century. In sending some of Hodges' work to the Admiralty from Cape Town in 1775, two and a half years after their previous anchorage there, Cook said: "The views are all by Mr Hodges and are so judiciously chosen and executed in so masterly a manner, as will not only show the judgment and skill of the artist, but will of themselves express their various designs; but these are not all the

works of that indefatigable gentleman: there are several other views, portraits, and some valuable designs in oil colours, which, for want of proper colours, time and conveniences, cannot be finished till after our arrival in England." We may surely endorse his verdict. Only the mischance of these works having been hidden from the general view for over one hundred and fifty years has robbed Hodges of the reputation he deserves as a topographer of the Pacific Ocean.

JAMES WEBBER, R.A.

James Webber, who was chosen to be the official artist to Cook's third voyage (1776-80), was a man of very different calibre and training. Born in England of Swiss parents, he had been sent to France and Switzerland for his artistic instruction. His teacher in Switzerland was Aberli, the originator of a picturesque and successful manner of portraying Swiss landscape, the true forerunner of the 19th-century chromolithograph and the contemporary coloured postcard of mountain scenes.

One would have imagined that training at such hands and in such scenery might have given Webber an even more excitable imagination and a yet keener eye for novelty

than the untravelled Hodges. Strangely enough no such result is apparent in his work for Cook. All his transcripts of landscape are sedulously toned down in key, studiously exact and carefully documentary.

Webber chiefly adds to our knowledge in his studies of the faces and figures of the natives, and his drawings of them in their groups at festivals and ceremonies. He has recently been criticized rather heavily on the score of ethnographical inaccuracy. No doubt the engravings which illustrate the journal of Cook's Third Voyage represent beings who are half native and half European, but we must lay a due share of the blame at



From the print in the Victoria & Albert Museum

A night dance by women in Hapae of the Friendly Islands. One of the festivities with which the natives welcomed Cook in May 1777; engraved from a drawing made at the time by James Webber

the door of the engraver. All students of art are familiar with the process by which facial form and the shape of costume is distorted by the interpreter. For instance, when an 18th-century engraver attempts to reproduce a 16th-century portrait he is quite unable to understand its structure, and the result is neither a credible 18th-century personage nor an intelligible transcript of the original. But when we can look at Webber's drawings we can see how true an attempt he has made to enter into the shape and spirit of native life. It is hard to overemphasize the importance of such records of the Polynesians before their natural customs had been affected by long intercourse with Europeans.

Again Cook notes down the exact purpose of Webber's engagement: "That we might go out with every help that could serve to make the result of our voyage entertaining to the generality of readers, as well as instructive to the sailor and scholar, Mr Webber was pitched upon, and engaged to embark with me, for the express purpose of supplying the unavoidable imperfections of written accounts, by enabling us to preserve, and to bring home, such drawings of the most memorable scenes of our transactions, as could only be executed by a professed and skilful artist".

And so Webber makes a careful drawing of the open-air dance in Hapae in "an open space amongst the trees, just by the sea, with lights, at small intervals, placed around the inside of the circle". Or again, for a grimmer record, he goes to see a human sacrifice in Tahiti, and his drawing is a vivid gloss on Cook's detailed account of that weird ceremony. Then, quitting the South Seas for the west coast of North America, he draws the interior of an Indian house. "After having made a general view of their habitations, I sought for an inside, which might furnish me with sufficient matter to convey a perfect idea of the mode in which these people live", Webber says of this drawing. "Such was soon found. While I was employed, a man approached me with a large knife in his hand, seemingly displeased, when he observed that my eyes were fixed on two representations of human figures, which were placed at one end of the apartment, carved on planks, of a gigantic proportion, and painted after their custom. However, I took as little notice of him as possible, and proceeded; to prevent which, he soon provided himself with a mat, and placed it in such a manner as to hinder my having any longer a sight of them. Being pretty certain that I could have no future opportunity to finish my



From the print in the Victoria & Albert Museum

human sacrifice in a Morai (an altar or sacred enclosure) in Tahiti, as depicted by Webber. On his last voyage Cook attended the ceremony at which a native of Tahiti was sacrificed to placate the god before a battle



From the print in the Victoria & Albert Museum

the inside of a house in Nootka Sound, Vancouver Island. A painstaking record by Webber of the habitations of the Indians met by Cook in 1778, showing fish hung up in rows, and their carved and painted wooden images



From original water-colour by Webber in the Victoria & Albert Museum

"An incident in Captain Cook's Voyages." The coffin of a member of the crew (perhaps William Watman, the gunner) is brought ashore for burial while natives watch respectfully from a distance

drawing, and the object being too interesting to be omitted, I considered that a little bribery might probably have some effect. Accordingly I made an offer of a button from my coat, which, being of metal, I thought they would be pleased with. This, instantly, produced the desired effect. For the mat was removed, and I was left at liberty to proceed as before. Scarcely had I seated myself, and made a beginning, when he returned and resumed his former practice, continuing with it till I had parted with every single button; and when he saw that he had completely stripped me I met with no further obstruction."

Back in the Pacific he made his touching drawing of the funeral of one of the crew—perhaps of old William Watman, the gunner's mate, whose grave is still carefully tended in Hawaii (Owhyhee). There, too, he witnessed the death of Cook, and his record of it, engraved and reproduced many times, has become the standard representation of that

unawaited and tragic event.

Nor was the effect of Webber's drawings limited to the publication of engravings after them in the journal of Cook's Third Voyage. The year after this publication, in 1785, the management of Covent Garden based upon it a pantomime written by O'Keefe, entitled *Omai, or a Trip Round the World*. It was an ambitious production, including a procession of the inhabitants of Tahiti, New Zealand, Tanna, Kamtschatka, Nootka and the other stations of that voyage, and ending with an apotheosis of Cook. The scenery was designed by De Louthembourg in consultation with Webber. De Louthembourg's designs for one of the tropical sets (which includes a quick transformation scene to fire) have survived and are now housed in the Victoria and Albert Museum. It is fascinating to see in these models how the drawings Webber amassed so painstakingly on his long and adventurous journey round the world provided the backcloth for a London entertainment.

Snow Avalanches

by GERALD SELIGMAN

With the increase of travel facilities many more visitors from Britain are enjoying, for the first time, the hospitality of Alpine resorts. Few among them, however, will have more than a superficial knowledge of that most terrific of menaces to life in the Alps, the snow avalanche. The President of the British Glaciological Society (a past President of the Ski Club of Great Britain) shows herein what science is doing to combat this menace, and how much yet remains for it to do

THERE are few manifestations of unbridled force in nature to equal that of an avalanche. When the whole snow-cover of a mountain-side, perhaps half a mile broad, breaks with a thud and a rumble and millions of tons of snow roar down with unbelievable velocity, the observer, even if in safety, has a feeling of awe and powerlessness not easy to describe. Speeds of over two hundred miles an hour have been recorded. Even with smaller avalanches the blast caused by air-displacement is terrific. It will cut a swathe through a forest of grown pine trees on the opposite side of a valley, snapping them off as though they were so many carrots. Some years ago a large section of an iron bridge in the Rhône valley was seen to be thrown 150 feet up into the air.

Naturally the damage to property in mountainous regions has been immense and has increased as civilization has penetrated deeper into the valleys. In recent times the loss of life, too, has been great. When modern progress, among its other manifold blessings, enabled men to wage war in the mountains the casualties through avalanches became enormous. It has been stated that in the first World War 60,000 men perished in the snow—10,000 Austrians in one wild night of avalanches on the Tirolese front.

The earliest dwellers in Alpine districts sought to protect themselves and their cattle by building their villages in places as far as possible removed from threatening hillsides. When, with increasing population, safe sites became more difficult to find, they began to build protective walls to dam up the avalanches, or wedge-shaped structures like the bow of a ship to split the snow so that it passed harmlessly by their buildings.

It was soon found that this system of diverting falls of snow from vital points had advantages over damming walls which had to be of immense strength and were even then often overwhelmed. So the wedge-shaped structures were modified into long walls set at an acute angle to the threatened fall, but even these did not prove fully efficient, for instance in the protection of roads and railways. The next

step, taken in recent times, was more scientific. Avalanches attain their greatest strength at the foot of a hill when they have gathered together the whole of the snow-cover in their path. By building numerous transverse walls from the top to the bottom of a slope the snow-cover is cut into sections and no great concentration of snow is possible. *Divide et . . .* This has proved efficient, but the cost is very great in a country like Switzerland where avalanche danger threatens on every side. Moreover, it is found that in the alternations of frost and thaw the life of these expensive walls is not over-long.

A modern innovation is to bring down avalanches by mortar or even longer range gunfire. This has proved valuable at specific points, as for instance on slopes above railways or roads, action, of course, being taken at times when traffic is stopped. But here again the difficulty of applying such measures in all the places where it is needed is obvious. The final solution, if solution indeed there is, has not been found.

Let us now examine the nature of avalanches. When snow falls on a precipitous slope it cannot accumulate, but slides harmlessly off. On less steep ground, however, it will collect until it reaches many feet in depth. If snow were an unchanging substance it would remain like that, but there are several agencies which cause metamorphoses within the snow mass and gradually make it more and more unstable, until it can no longer remain poised on the hillside and it comes down as an avalanche.

The subject may be most easily understood if we divide avalanches into three main types:

1. *Dry new snow avalanches.* When snow falls at low temperatures, as is usual during an Alpine blizzard, it is dry. It is crystalline in form, the flakes having for the most part little rays like minute feathers. These interlock and give the snow a certain amount of internal cohesion, so that it forms a continuous blanket. It might be likened to an accumulation of hairy flower-seeds, each one locked to its neighbour by tiny spicules. After the snow-



storm is over and the sun has reappeared, these little rays, being very sensitive to temperature variations, evaporate and the bolts of the interlocking system are, as it were, drawn; the mass loses cohesion and slides down as an avalanche. It is as though the deposit of flower-seeds had changed into one of sand. Naturally this will only happen if the slope is sufficiently steep and if the weight of the fallen snow is sufficiently great; if the bed onto which it falls is smooth it will more easily slide off than if rocky protuberances provide a certain amount of anchorage. This type of avalanche occurs more frequently after heavy snowfalls.

2. *Wet snow avalanches.* In this case the change within the snow mass is one of melting. Melting conditions may permeate the whole snow mass from top to bottom; the snow becomes almost slushy and can no longer maintain its former equilibrium; in addition, or alternatively, melt-water from snow amongst rocks higher up (which absorb heat more easily than a uniform layer of white snow) may percolate to the base of the snow-cover and release its grip upon the underlayer, forming at the same time a lubricated surface over which the snow slides down. In these ways most of the large spring-time avalanches in the Alps are released.

3. *Wind slab avalanches.* We have considered two metamorphoses of snow, each producing its typical avalanche. We now come to a third. When wind gathers up snow it drives it over any intervening ridge and deposits it on the lee side. Under certain conditions this snow will harden until sometimes even a nailed boot can make no impression upon it. Thus a solid, coherent coating of snow may cover acres of a mountain-side. Then suddenly some stimulus (the nature of which we will consider later on) may break up the covering into thousands of hard, massive blocks. It gives way and comes down as a wind slab avalanche. These avalanches may fall during a blizzard or several days after, for reasons we shall also give presently. Wind slab avalanches are usually 'dry' but may also be released by thaw conditions like wet snow avalanches.

With this brief survey of the principal avalanche types let us consider what steps have been taken to investigate their causes and minimize their danger.

The phenomena of snow and ice in the Alps began to interest explorers and scientists as early as the 16th century. Their work was mainly devoted to glaciers—why they existed at all, what was their structure and why they flowed, stream-like, down the mountain-side.

The dispersal of a threatening avalanche by blasting. A Swiss soldier digs a hole to allow the charge to be placed deep down in the snow

It was not until 1880, when the head of the Swiss Forestry Department, J. Coaz, was charged with the construction of avalanche defences, that any really thorough examination of the nature and causes of avalanches was begun. At the turn of the century, when ski-ing was attracting more and more winter visitors to the Alps, still greater attention began to be paid to the subject. Records of this period are in the names of Swiss, Austrian and German writers, although credit must be given to E. C. Richardson, the "Father of British Ski-ing", who published in 1903 an excellent account of avalanche lore to date.

The enormous avalanche casualties of the first World War, coupled with the sudden increase in the popularity of ski-ing which followed it, drew attention to the need for better knowledge of snow-craft in the mountains, and in its furtherance no one did more than Arnold Lunn, whose book, published in 1921, served as a prototype for many similar books by continental writers. Indeed it is still not out of date today.

But it was not until 1931, when the holiday traffic rose to an unprecedented volume, that a really intensive scientific study of the causes of avalanches was begun. In this the contributions of British investigators on avalanches have not been negligible. In that year the Ski Club of Great Britain sponsored a comprehensive investigation into the whole avalanche question from both the theoretical and the practical side. The results were published in book form by a private individual in 1936. The writer believes that this book still constitutes the most comprehensive account of avalanches in any language.

At this time, too, the Swiss Federal Department of the Interior set up a Commission for Research on Snow and Avalanches. At first its personnel consisted mainly of members of the Forestry Department, but as they developed their theme they drew in crystallographers, physicists, meteorologists and engineers from official and academic sources.

Under their guidance observations were made in the field at various centres, but it was soon found that such isolated researches did not form a sufficiently complete groundwork on which to base more precise investigations. It thus became obvious that laboratory data must be added and in 1936 a rough wooden building was erected at the Weissfluhjoch at the top of the funicular ascending from Davos to the Parsenn region.

The choice was good. "The Parsenn" is probably the most popular ski-ing district in the world and avalanches are by no means



The charge is fired by remote control. The explosion causes the unstable snow masses, rocks and rubble to roar down with unbridled fury



Eidg. Institut für Schnee- und Lawinenforschung Weissfluhjoch

The Weissfluhjoch Research Institute as seen from the roof of the Parsenn funicular. The mountains in the distance lie in Swiss and Tirolese territories and form part of the Silvretta Group

uncommon in many parts of it. It is fairly near to the centre of academic Switzerland, Zürich, whence many of the research staff are drawn. Its considerable height, 8700 feet, enables snow research to be continued in the field until late in the spring; nevertheless access is easy by means of the funicular railway.

Through the courtesy of the Swiss authorities the writer, who was at that time also carrying out research work on snow and avalanches, made many trips to this little laboratory and witnessed the gradual development of its technique. This became so fruitful that a complete laboratory on a much more elaborate scale was designed and built. It was opened in 1943. The research workers could now live on the spot instead of having to go down to Davos every night to sleep.

The new building is provided with complete living accommodation, including a kitchen. There are offices, a dark room and a work-

shop; but the main feature consists of two excellent laboratories. In these temperatures of -5° and -10° C. respectively can be maintained throughout the year, so that investigations need not cease with the approach of warm weather.

With such facilities, which must stir the envy of every British glaciologist, it is not surprising that Swiss snow and ice research is forging ahead.

It may be observed here that avalanche research work, important though it be, is no longer the sole aim of the Weissfluhjoch station. Frost and snow create so many problems in the daily life of countries like Switzerland that it is natural that many interests are anxious to grasp the opportunity to have their particular difficulties solved by scientific investigation. Here are a few of the subjects which the station is handling or could in future handle: the influence of snow-cover and avalanches upon afforestation; the influ-

ence of snow-cover on plant germination and growth; the water content of catchment areas for purposes of irrigation; a comparison between the behaviour of snow slopes and earthworks for the mutual assistance of snow study and civil engineering; the influence of frost (frost-heaving) in building and in road and rail construction; the mechanical clearance of snowfalls; the protection of communications and buildings from snowfalls; traction on snow; making runways for aircraft on snow and glaciers; ice accretion on aircraft; the insulating power of snow; the many military problems of warfare in the snow. All these, in addition of course to avalanche research, have a practical issue.

There are many other problems awaiting solution, most of which have arisen from the realization of how little was known of the physics of the ice crystal. Amongst these the most important are: the structure and flow of glaciers—in this connection it is interesting to note that the British glaciologists who first turned their attention to snow research passed

automatically on to glacier research in the endeavour to resolve problems found to be common to both, and now the Swiss appear to be doing the same; meteorological problems of many kinds; the crystallographic analogies between ice and metal crystals near their melting points; and, finally, the analogies between the behaviour of ice in glaciers and that of rocks subjected to high temperatures and pressures. There will be no unemployment at the Weissfluhjoch.

Hitherto the work of avalanche research has been largely of a preliminary character, as is only right and proper in a subject as new as scientific ice study. Looking back it is astonishing to see what an immense amount has been written but how completely lacking the writings have been in any systematic assembly of the primary factors. Worthy scientists have spent a month or a summer in the Alps and have returned to write books, often brilliant, often instructive, but often, too, weakened by unsubstantiated theories or assumptions. It is as though a new language were being fashioned,

In the cold laboratories many ingenious machines have been installed for testing the properties of snow. Here the 'creep' of snow (its tendency to flow by plastic deformation) is being measured

P.A.-Reuter Photos





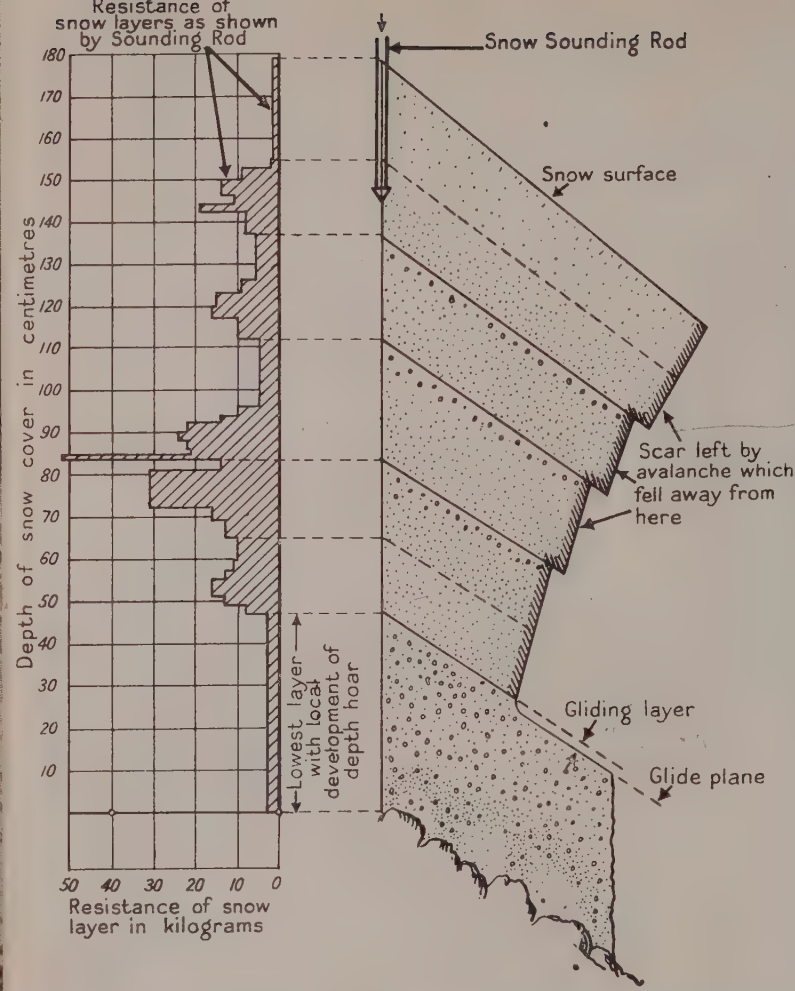
Marga Steinmann

An avalanche which has started from an ice cliff above the top right-hand corner of the picture and will finish below the bottom right-hand corner—a vertical distance of over 5000 feet. Such scenes give the observer, even if in safety, a feeling of awe and powerlessness hard to describe



P. A. Reuter Photos

The snow sounding rod. This is driven into the snow by raising and releasing the weight seen above the man's hands. The impact drives the rod varying distances at each blow, depending upon the presence or absence of weaknesses in the snow mass; these are a direct measure of its stability



A resistance section of the snow-cover which remained above the point of rupture after a wind slab avalanche had fallen

the grammar being left in abeyance until some more propitious occasion.

I think this state of affairs is now approaching its end. The Swiss authorities are laying down data proved by the most careful methods. At the same time other nations are doing the same. In this country the British Glaciological Society has formed a strong Committee with headquarters at the Cavendish Laboratory, Cambridge, to study glacier physics; in Canada officially sponsored research similar to that of the Swiss is being started. There is a small amount of liaison between these three countries.

From the foregoing it will be clear that the Weissfluhjoch scheme must be evaluated at its long-term usefulness. Even, however, in the short period since its inauguration important

results have appeared, some of immediate scientific value, some of help in forming the basic principles for further research and some of practical use. Of the latter, with a few exceptions, no very important entirely new factor has yet come to light, as the Swiss authorities themselves appear to admit. This is not surprising if we realize that the fall of avalanches depends on many intricate interconnected factors—the upper air conditions, the force, humidity and direction of the wind during and after a fall, the air permeability of the snow, its cohesion, plasticity, compressibility, ductility and friction, the nature and temperature of the ground or of the old snow upon which the new snow falls and the air temperatures after it has fallen. The credit for the discovery of the existence of many of these influences and their effects must be given to the research station, but all the facts have not yet been extracted from their complicated interplay.

Nevertheless many works have been published, some of outstanding merit. More are due to appear. One of the most valuable discoveries is concerned with the 'creep' of snow and ice. This appears to be analogous with creep in metals. Metals when stressed at high temperatures, but below the 'yield point', reach a condition when additional stress causes a slow flow or creep.

Snow on a hill-side, when near its melting point, behaves in the same way, the stress in this case being caused by the slope of the hill. If we imagine the snow-cover to be firmly anchored by rocks at its upper end and by a flat valley at its lower, it becomes clear that the force of gravity causes tension at the top and compression at the bottom. These stresses are invisible to the naked eye but are easily measured by scientists provided with suitable apparatus.

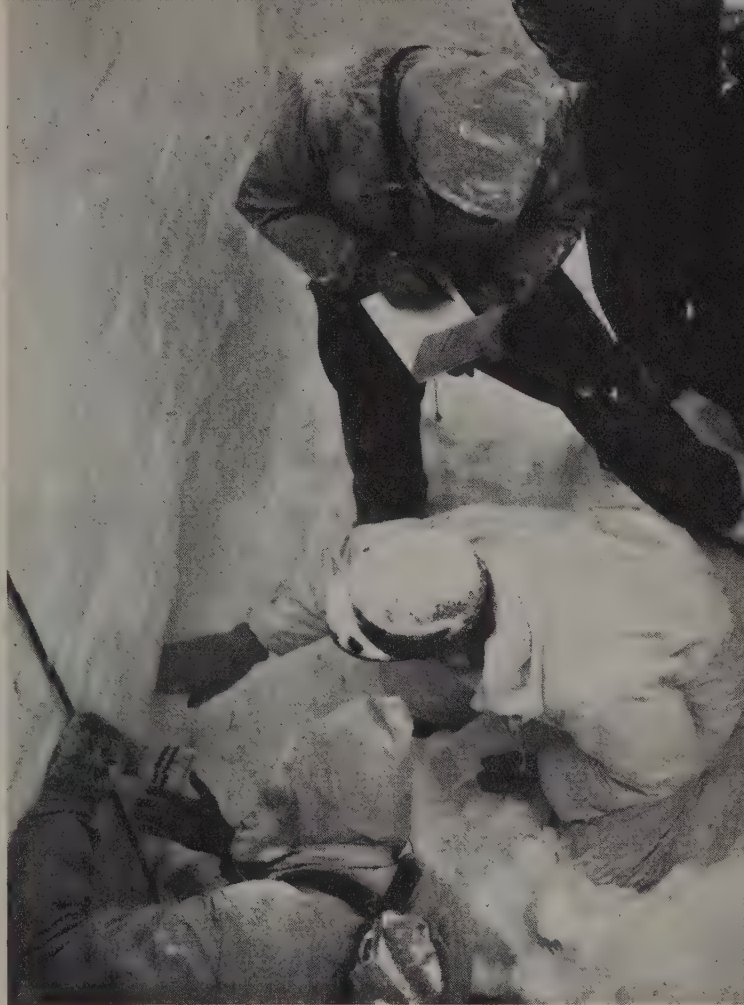
When on steep slopes the stresses become sufficiently powerful, equilibrium is disturbed, the whole snow-cover breaks up and an avalanche is released. In the case of dry, new snow a single rupture will occur high up on the mountain-side below which all the snow comes

away. In the case of strong, brittle wind slabs these forces reach such magnitude before being released that the whole snow-cover, as we have seen, breaks into countless blocks.

It has always been a mystery to skiers that such avalanches fall at entirely unpredictable times, either during, or soon after, a blizzard, or sometimes even long afterwards. This research is therefore a step forward. The discovery of these stresses, which obviously will vary with varying conditions, tells us *why* the time of fall of such avalanches is uncertain. Our knowledge is not yet sufficient to enable the skier in the mountains to tell with any certainty *when* the fall is likely to happen, but clearly we are on the way.

Another case may be given in which a scientific basis has been found for what has long been known to the experienced ski-mountaineer. As mentioned above, snow is more likely to avalanche if the layer upon which it has fallen provides a good gliding surface. Now it often happens that this slippery layer only forms long after it has been covered up by more snow. In the case of dry avalanches it is often found to consist of tiny harp crystals of the so-called "depth hoar". These take a long time to grow and, unlike ordinary snow, once they have formed they never coalesce but lie loose and friable like myriads of large shot. Obviously the snow layers above them become highly unstable.

The Weissfluhjoch scientists have done a good deal to elucidate the conditions under which this depth hoar forms. They have also devised a method of ascertaining the presence of these treacherous layers by sounding from the surface down through the snow-cover. An illustration on page 473 shows the Snow Sounding Rod used for this purpose. It consists of a metal bar which has at its upper end a loose weight moving vertically on a guide. The weight is raised and allowed to fall a constant distance. This drives the rod into the snow and its degree of penetration under each impact is measured. The distance of penetra-



P.A.-Reuter Photos

Testing the cohesion of snow layers in a pit. The soldier wearing the mitten has inserted his hand at a point of weakness

tion varies inversely as the cohesion of the snow. A graph is plotted and the cohesion of each part of the snow-cover can be measured. When a layer containing much of the loose-lying depth hoar is reached clearly the cohesion and resistance to penetration become very small. The section shown on the opposite page was made immediately above and through the rupture from where an avalanche fell and it will be seen how precarious was the anchorage of the snow. Often the layer permeated with depth hoar comes down too, but in this case it did not do so, perhaps because the rugged nature of the ground below anchored it.

Previously the method used was to dig deep pits which revealed the snow section so that the consistency of the strata could be ascertained



P.A.-Reuter Photos



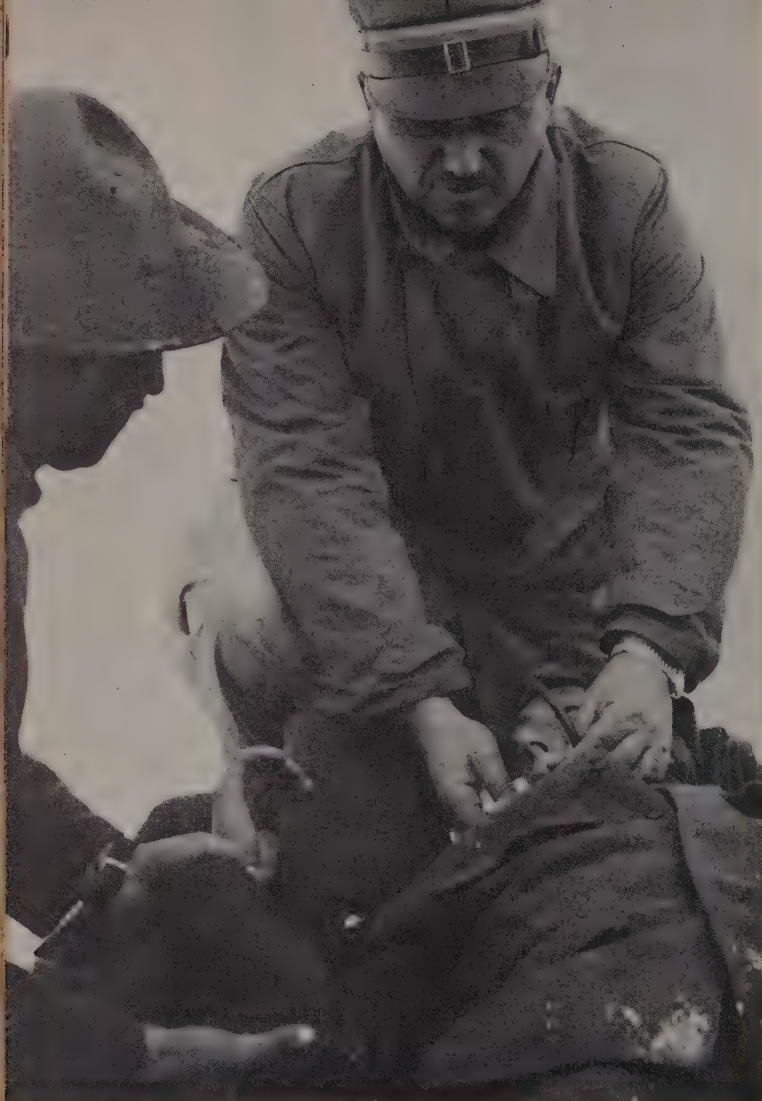
While of little use in the field, when the opportunity of digging a deep snow-pit occurs the method of 'finger-tip' touch enables points of weakness between the snow layers to be diagnosed and the stability of the snow-cover to be tested

(Left) The equipment of the Swiss Army Avalanche Service personnel. Note the snow sounding rod and the aluminium shovel. Many thousands of these shovels are used for various purposes by the Swiss Army and other winter ski-mountaineers



P.A.-Reuter Photos

Patroller Telli, a notable figure in the Parsenn Rescue Service, who is ready for duty day or night. His toboggan goes with him on patrol for transporting injured persons should this prove necessary



P.A.-Reuter Photos

Buried in the wake of an avalanche and nearly suffocated, a victim is found just in time. Members of the Swiss Army Rescue Service administer oxygen prior to his removal to hospital

by touch, but this naturally entailed much work. Of course neither method can be used in the field but occasionally the presence of a dangerous substratum can be recognized by thrusting an inverted ski stick into the snow. A correct diagnosis by these means is not easy, but when successfully carried out it has the great advantage of revealing the state of the snow at the actual danger point, for its nature may vary from place to place.

To overcome this difficulty the *Lawinendienst*

—Avalanche Service—has been inaugurated. This was originally brought into being to notify avalanche risks to the Swiss Army, deployed in the mountains throughout the war. More than a score of local reporting stations have now been created which communicate the meteorological, as well as the snow, conditions to the central station at the Weissfluhjoch. In this way a cross-section of these conditions over a wide area can be made; they are then broadcast as a general summary with comments on the danger of avalanches.

It is hoped later to increase the number of ancillary reporting stations and to give forecasts of the *probability* of avalanches as opposed to *existing* danger. This is a task that can only be undertaken with confidence when knowledge of the many complicated issues has increased. Of these there is little doubt in my mind that the meteorological factor is the most important. In fact, my advice has always been to ascertain the past weather and to watch the present weather and the weather forecasts; it is remarkable how in this way a rough and ready knowledge of safety or danger in the mountains can be gained. I specially recall one grave disaster (there have been dozens of others) where several lives might have been saved if even the most rudimentary tenets of weather lore had been observed.

The Avalanche Service is sure to reduce the number of avalanche casualties among the uninitiated, of whom there is now bound to be a great influx into the Alps. Nevertheless

central warnings and forecasts are prone to error and those who intend to ski seriously and to go far afield into the mountains would be well advised to study for themselves the wide range of snow-craft. For the knowledge of the character of the snow-cover not only gives warning of dangers but also makes it easy to tell where to find the best snow for skiing. Then, and then only, will skiers venture forth not solely with more confidence and safety but with greatly added pleasure.

Animals in Art

I. Palaeolithic

by M. C. BURKITT

With the following article the author of Our Early Ancestors, The Old Stone Age, etc., initiates a series designed to show how the artist, in different countries and at different times, has tackled the problem of depicting animals. As is proper to The Geographical Magazine, special consideration will be given to the way in which the artist's approach to this subject has been affected by his environment and the materials at his disposal



Most people have heard of a so-called cave art: they know that in the depths of natural caves in various parts of southern France and northern Spain, paintings and engravings have been found representing animals many of which are extinct from the world today, and which were the creation of artists living anything from 10,000 to 20,000 years ago. What is not always realized is that a number of distinct styles of painting and engraving can be distinguished among these pictures. They are not all of the same age, and indeed a chronological sequence of styles has been determined for the period when these artistic folk were living in Western Europe. Much scientific work has been done, and much information is now available as to the life and culture of these people, but little study from an artist's point of view has yet been made of these drawings and paintings. It is only intended here to raise a few problems from this standpoint; a detailed study would require considerable work on the originals and more technical knowledge of art than the writer possesses.

The earliest style of engraving known is illustrated on page 480; the drawing is familiarly known as "Pooh" the bear. Notice the method of treatment, as though the shadow

of the animal had been projected on the cave wall and a simple outline made round it. But notice, too, the vigour of the drawing coupled with the economy of line. How different is the treatment of the two mammoths face to face on the same page, or the head of a hind above, which is differently drawn again. In the case of the mammoths the drawing is no longer a mere outline, and the engraving is bold and complicated. In the case of the hind's head, the wall was little more than scratched, the whole surface of the head is filled with lines, and the treatment is more angular. The early or "Pooh" style has its analogue in the paintings. At first there is no perspective, though should the animal have horns, these appear as if seen full face. Generally only two legs are figured and the treatment of the eye if indicated is very primitive. The woolly rhinoceros as shown on page 481 illustrates well a development of this primitive style. The drawing below is of especial interest, though from a rather different point of view. It was engraved on a piece of bone actually found in a prehistoric home site. This type of art is of course very sophisticated; yet it had already evolved within a limited medium some 10,000 years ago.

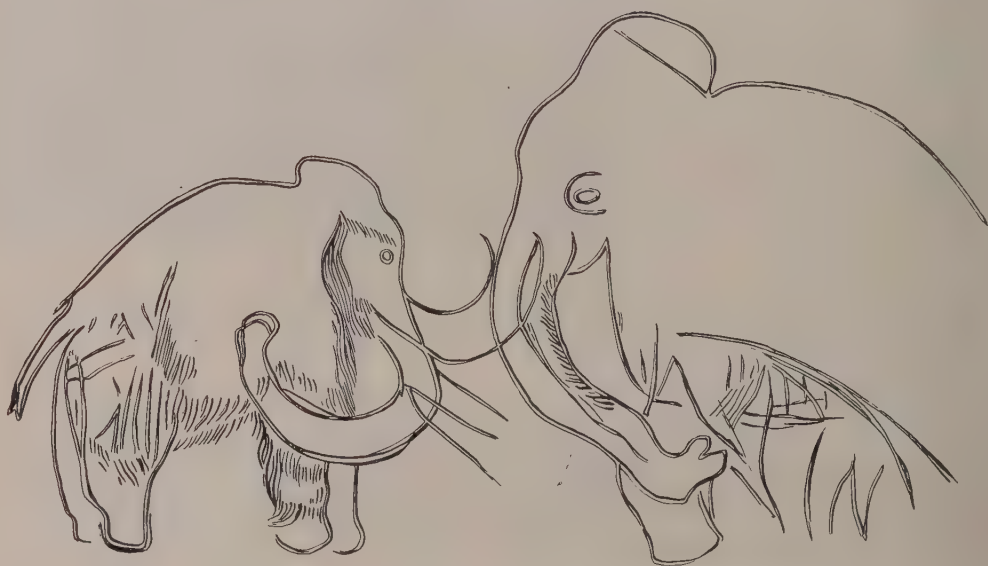


Illustrations from the works of the Abbé Breuil

The artist sets himself to represent a herd of reindeer with only 'five inches of canvas'! To the front and rear are the 'signature' reindeer: a forest of antler stands for the rest of the herd



The earliest known style of engraving: a bear (familiarily called "Pooh" by some archaeologists) from a cave, Venta de la Perra, in north Spain. A simple outline is cut with a flint chisel in the rock and only two legs are figured. The eye is barely indicated and there is no attempt at shading



Two mammoths engraved by an early Magdalenian artist on a cave wall at Combarelles near Les Eyzies in southern France. The double outline simulates 'relief'; the hairy nature of the beasts is indicated and is used to produce an impression of solidity; there is a sense of life and movement



*The accuracy of this drawing of a now-extinct woolly rhinoceros, made perhaps 20,000 years ago high up on the wall of a long narrow fissure at Font de Gaume near Les Eyzies, is proved by comparison with the photograph of an actual animal of the same species (*R. tichorhinus*), shown below*



A female woolly rhinoceros set up in the Museum at Cracow. Some time during the last glacial maximum she went down to drink in a stream near Lwow and fell in. Her body was preserved, until found in 1907, in one of the natural pits full of bitumen and salt which occur in that district



This horse is painted in monochrome, a shaded technique being employed as in the case of 'stump drawing'. As a result the animal seems to stand out in relief. There are a number of similar examples of this style among early Magdalenian paintings



An ox (Bos primigenius) in 'flat wash'. This technique used to be considered as characteristic of the Middle Magdalenian culture. The recent discoveries at the Cave of Lascaux have, however, yielded many animals painted in this style which belong to the earlier, Aurignacian culture



Front of a wolf in polychrome from the cave of Font de Gaume, near Les Eyzies (France). Wolves are rarely depicted in Palaeolithic art. The horse and ox opposite are also from Font de Gaume

The pictures opposite show two totally different styles of painting, the one stump drawing, the other flat wash, actually not quite of the same age. In the former, an attempt is made to produce a sense of solidity by a shading technique. Only one colour is used. In the latter case the treatment resembles that of a silhouette. But the most developed styles of the cave art occur towards the end of the period, when polychrome painting was employed (above, and on pages 484 and 485). As we have found heretofore the treatment is still naturalistic. Of course there must always be a certain amount of conventionalization when any three-dimensional object is represented in two dimensions, but none the less the effect is wonderfully life-like, and where there are characters much exaggerated it is clearly of set purpose. The colours are not always blended in the same way, but unlike some of the so-called Bushman paintings of South Africa they are applied so as to grade into one another without harsh contrasting colour junctions. Though several colours are used, one does not get the impression of masses of different ones placed side by side entirely distinct the one from the other. But enough will have now been said to show that a full-dress study of the cave art from an artist's point of view still awaits an investigator pre-

pared to work in the caves themselves. Perhaps these paragraphs will stimulate some qualified person to undertake this task!

Turning from questions of style and treatment to those of how, where and why, a few points can be mentioned in the space that remains. The chief pigments used for the pictures were made from such minerals as ochres and manganese dioxide which occur naturally in many geological deposits and were collected by prehistoric man, in whose homes they have been found in the course of excavation. The colours thus obtained were varying shades of reds and yellows, and black. Burnt bones also produced a coal-black paint. The mineral substances were ground up and mixed with fat and applied to the cave walls with animal fur or hair brushes or, as is suggested by certain styles only, with a sort of stamp. This use of fat in mixing the colours has had a great effect on the preservation of the paintings, for most cave walls tend to sweat with the percolation of rain water through the fine pores of the limestone, and if it is considerable this sweating etches away the surface of the wall, destroying any painting at the spot in question. If, however, the sweating has not been too intense the clogging of the pores with the fat of the artist's colours has prevented the etching action and saved the wall surface and the painting too.



A polychrome reindeer from Font de Gaume. While the treatment in general is naturalistic, showing details such as the cloven hoof, the artist has exaggerated some features



A bison in several colours on the ceiling of the cave at Altamira, a few miles from Torrelavega in northern Spain. Minerals and burnt bones, mixed with fat, provided the pigments



A polychrome wild boar, the sanglier au galop, also at Altamira and quite close to the foregoing bison. Notice the vigour of the painting and the animal's lively tail. All these pictures were made, with a purpose that can be convincingly explained, by flickering artificial light

The depths of these long caves are of course utterly dark and the cave artist had to use an artificial light. A few stone lamps of Upper-Palaeolithic date have indeed been found; usually, however, a piece of skull was probably used with fat for fuel and moss for wick. A modern Eskimo lamp is a useful parallel.

The distribution of this amazing art is apparently limited to southern France and part of Spain, with one known site in the 'heel' of Italy. To begin with of course there can be no cave art without caves, and preferably long, deep caves at that; and such natural caves only occur in limestone districts. Further limiting factors seem to have been that if, as seems certain, the production of the art was bound up with the practice of some peculiar ritual in connection with the food supply, only the folk who had developed this ritual will have wanted to paint their caves; and again only those who *could* paint will have used these particular rites.

It is of course clear that these Western European Aurignacian and Magdalenian cave painters must have belonged to an artistic folk, but in reply to the question "why

these paintings?" it cannot be suggested by anyone who knows the caves and the circumstances in which the drawings occur that here was a case of 'art for art's sake'. Nor can mere decoration have been their purpose. No one lived in the depths of these subterranean labyrinths, much less can have wanted to ornament their walls. Any idea of a desire for self-expression can equally be ruled out—there were many more accessible canvases in the daylight cave mouths! There is no explanation which so convincingly fits the circumstances as that of some sympathetic magic ritual practices connected with the ever-pressing problem of the food supply. The animals painted are almost always those whose bones are commonly found by the home-hearths of the hunting people who were the artists. Analogies from the customs of modern primitive peoples are not wanting. The change of styles of drawings over wide areas suggests that there may have existed a guild of artist-medicine-men-priests, and indeed all other evidence confirms that this is the correct explanation of these astounding paintings.

Wild Silk Moths of the World

by L. HUGH NEWMAN, F.R.E.S.



Kodachrome by L. Hugh Newman

Indian shantung and tussore, known throughout the world of commerce for its supreme quality, is obtained from the Tussore Moth, found chiefly in Bengal. The sexes differ remarkably in colour, the males being chestnut red while the females are tawny or, in some districts, mustard yellow

THE majority, and certainly the most handsome, of the silk-producing moths of both the New and the Old World, fall into a group known as the Saturniidae. They undoubtedly take their name from the ringed "eye spots" that usually appear on one or both pairs of wings in most species, reminding one of the ringed planet Saturn. Although these silk moths attain a size of six inches or more in wing span, the fact that the prevailing colour is rich brown, toning into various shades of olive green, yellow, and pink, makes them remarkably inconspicuous in their native surroundings.

Unlike many of our British moths such as the Emperor (page 492), Kentish Glory and the 'Tigers', which all fly in the brilliant sunshine, these giant silk moths only take their flights at specific hours; at dusk, about midnight when most of them mate, and again just before dawn. All through the day they remain perfectly motionless, sitting in a curious position with their wings spread out or raised

over their heads like butterflies, never folded down across their backs as is the general rule with moths. This method of resting has obviously been evolved, as the natural place for them to choose during the day is a branch of one of the leafy bushes where the females deposit their eggs. Hanging from the branch with their wings partly concealing their plump furry bodies, they would be most difficult to detect by a foraging bird, as the coloration suggests a dead leaf on the branch.

The life of the silk moths is exceedingly brief, as they are all born with only a rudimentary proboscis, and they therefore have no tongue that can be unrolled and used for drawing up nectar from flowers, which is the only form of nourishment other moths take during the whole of their adult life. They are, however, attracted by flowers during their flights, but probably only because their sense of smell is so highly developed.

Perhaps the most curious fact emerging

from the study of these silk moths is the diversity of environment that this closely related family of more than four hundred different species favours as breeding quarters. The two commonest North American species, the Robin Moth *Platysamia cecropia* (below and page 488) and the Ailanthus Silk Moth *Philosamia cynthia* (page 493), can both stand months of frost while within their thick silken cocoons which are spun amongst the leaves of the trees and shrubs upon which the larvae have been feeding. The Ailanthus was originally a native of China, but is one of the silk moths that has successfully been 'Westernized' for commercial purposes. Two varieties of this moth are *canningi* and *ricini*, both native to India, while a much darker variety *pryeri* only breeds in Japan. The climatic conditions where these three varieties of the Ailanthus moth breed must be very different from those which are experienced by the 'Westernized' American species.

The African Saturniidae are particularly interesting in that the larvae of many species do not produce any silk at all. On attaining full size they crawl down from their food plant and burrow into the ground to pupate. In appearance the moths of three well-known species are typical silk moths, and anybody not acquainted with the early stages of these insects would expect them to produce the normal silk cocoon. One species, *Saturnia suruka*, which occurs along the East Coast of Africa, has a caterpillar which is a so-called false Geometer, in that it mimics a dry twig, as so many of our true British Geometers habitually do during the daytime.

A Robin Moth has teased its way out of the bulky silk cocoon and crawled up a twig to dry its heavy wings, which hang down, rather like two damp blankets, on either side of its striped furry body

The lower slopes of the Himalayas are very favourable localities for a great number of the Asiatic silk moths. The most famous breed is the Tussock *Antheraea mylitta* (page 486). It spins a remarkable cocoon, with a long stiff stalk, which ends in a loop tightly fastened round a twig, and a number of cocoons hanging in a tree give the appearance of fruits. The silk reeled from these tough round cocoons is exceedingly strong but not nearly as glossy as that produced by the common silk-worm *Bombyx mori*. It is from this same region that the beautiful pale green Moon Moth *Actias selene* originates. It is one of the few silk moths that has long trailing tails, and as many as four or five broods during the year. A closely related species occurs in South America; it is in fact known as the American Moon Moth *A. luna*. They both take their names from the crescent marks

L. Hugh Newma



The American Moon Moth, so-called from the crescent marks in the centre of each wing, is rather smaller and slightly less colourful than its near relation the Indian Moon Moth. These moths, found in South America, readily hybridize, but most collectors prefer to keep each strain pure



Dufaycolor by Walter J. C. Murray



Dufaycolor by Walter J. C. Murray



Easily reared in Britain is the Indian Moon Moth, for the larvae will feed on many wild and cultivated shrubs including plum, apple, willow and hawthorn. The moths will also mate in a warm greenhouse; a female lays from 200 to 250 eggs over a period of ten to fourteen days

(Below) The American Oak Moth, sometimes called the Giant-Eyed Moth, is probably the most hardy and common of the whole great genus. In some towns in the United States the cocoons cluster so thickly—like bunches of grapes—among the twigs on trees in the parks and along the roadsides that gangs of men are employed in the autumn to cut them down

Dufaycolor by Walter J. C. Murray



Dufaycolor by Walter J. C. Murray



Kodachrome by L. Hugh Newman

The commonest of all the great Atlas Moths of Asia, here shown, is found in India and as far south as Singapore: many closely related species occur over the whole Indo-Malayan and Australasian Islands. The 'trade mark' of this group of moths is the four transparent patches in the wings

in the centre of each wing—*selene* being the Greek and *luna* the Latin for moon. Other allied species are found in the Spanish pine forests, on the island of Celebes, and in East and South Africa.

One of the giant silk moths, *Attacus atlas* (above), is found in India and as far south as Singapore. It is nearly the largest of all living insects, reaching up to ten and a half inches in wing span. The females have a particularly strong power of attraction for the males during assembling hours. A naturalist of the writer's acquaintance, while living at an Indian station in the hills, had collected a number of Atlas Moth caterpillars to breed out in his bungalow. The first moth to emerge was a female, and as he knew the habit of the moth was to remain motionless all day, he did not confine it in a box, but left it clinging to a picture rail where it had climbed to hang and dry its wings. He retired for the night completely forgetting the moth, but had not been asleep for very long, before he was awakened by a loud beating of wings against the window. Investigation proved that the noise was caused by four male Atlas Moths trying to gain admission to the virgin female. Although many moths all over the world show this sexual attraction in a greater or lesser degree, it is believed that the male Atlas will find a captive female from a greater distance than any other known

moth. As the Atlas has larger antennae than any of the other silk moths this indicates that the size of the antennae is a prominent factor in assembling. It has been proved that these pectinated structures must in some way be organs of smell, because males will be attracted by an empty box or cage which has previously housed a virgin female.

The Atlas shows what one might call the 'trade mark' of this group, which is four transparent patches in the wings. Many naturalists have suggested that these markings are protective devices. It has been noticed that if this moth is disturbed during the day it always begins a slow swaying movement of the wings, which look very like the expanded hood of an angry cobra. The American Oak Silk Moth *Telea polyphemus* (page 489) has eye spots on all four wings, and they are so perfect that even the glare of light on the cornea is imitated, giving a ringed effect. These eye spots are undoubtedly a means of protection, as the American Oak Silk Moth is eagerly sought after by birds and insect-eating animals. When they are at rest with wings closed the eye spots are naturally hidden and the moth looks like some inanimate object, but immediately it is disturbed the wings are opened and expanded, exposing the "eyes", and giving the intruder the impression that some fierce animal has woken up!

For the size of the insects, most silk moths lay rather small eggs. The Atlas, to which we have recently been referring, lays its eggs in small batches, but as each egg is about the size of a hemp seed the clusters are fairly large. On hatching the caterpillars usually make a meal off their egg-shells before commencing on the green leaves. The reason for this is probably an inborn instinct, not through any particular liking for the shell, but if each larva in the brood devours its own shell, there are no traces of their previous whereabouts and the individuals have a far better chance of survival in this early stage of their lives. Most of these silk moth larvae make remarkable changes in coloration every time they moult. In the last skin the Atlas has excellent chances of survival, and is even protected against changes in weather conditions. Its skin is powdered over with a curious white waxy substance, presumably to facilitate the draining-off of water after a tropical downpour. This covering might also very well be a protection against sudden changes in temperature, especially at sundown. The caterpillar has a thick row of spines down its back, set at a sharp angle, giving a streamlined effect. At the slightest sign of danger these spines can

be elevated like a porcupine's, discouraging any bird from attacking it.

The rich adornment of many of the larvae of these foreign silk moths must have some significance in relation to their environment. For instance the Moon Moth of India on crawling from the egg is black and red in alternate stripes. The second skin is brick-red, peppered with small black dots. The next change in colour is to bright apple-green with the dots enlarged to small knobs or tubercles, which gradually expand with the growth of the caterpillar until in the last skin they are bright yellow, each crowned with a magnificent tuft of hair. The vivid colouring of these caterpillars suggests flowers more than insects to preying enemies, and the growth of hair is highly reminiscent of the sticky traps of carnivorous flora. This form of mimicry is undoubtedly a natural defence against many enemies, including perhaps even the parasitic flies that deposit their eggs on the skins of these caterpillars; ichneumon flies probably have the instinct to avoid carnivorous flowers.

A very interesting example of instinctive behaviour was described by Captain Hutton at the time when he first discovered the wild silk-worm of the North West Himalayas



Walter J. C. Murray

The rich adornment of many of the larvae of silk moths has considerable significance in relation to their environment. It reaches fantastic heights in the grown larva of the Indian Moon Moth, which is dotted with brilliantly coloured tubercles each crowned with a magnificent tuft of hair



E. F. Linssen

(Above) The large pectinated antennae of the male silk moth are highly sensitive olfactory organs and in this photograph of Emperor moths the difference between male (beneath) and female is striking. (Below) A female Emperor clings to a twig, drying its wings in the sunshine

Walter J. C. Murray

which was named after him *Bombyx huttoni*. In a locality where hailstorms are not infrequent, soft-bodied creatures such as these would be badly damaged unless they could find adequate shelter in time. As, however, Captain Hutton reported, "they do not wait for the actual commencement of the fusillade, but no sooner are peals of thunder heard, than the whole brood seems to regard them as a warning trumpet call. All are instantly in motion, seeking shelter beneath the thicker branches, and even descending the trunk of the tree to some little distance, but never proceeding so low down as to lose the protecting shelter of the boughs. On the other hand, a mere rainstorm, even if accompanied by thunder, did not seem to affect them at all."

Many of the silk moths disguise their cocoons by weaving small twigs and leaves amongst the silk, and lodging them securely in the fork of a branch. From the commercial point of view the cocoons can be divided into two main groups, those from which the moth can emerge without damaging the silk threads, and the rest which are valueless unless the pupae inside the cocoons are stifled before they emerge. The British Emperor Moth *Saturnia pavonia* is a member of this first group. At the upper end of the cocoon are two rings of converging silk loops, one within the other, forming a kind of valve through which the moth can push its way out. The other group, which includes the common silk-worm *B. mori*, has a special device to enable them to break out of their round closed cocoons. Each moth





Walter J. C. Murray

has an alkaline gland on the top of its head, which it presses against the inner surface of the cocoon. This alkali is a natural solvent for the gum which binds the silk threads together, and when this is sufficiently softened the moth commences to tease the silk fibres apart, and eventually gains its liberty. At this stage its wings are merely two crumpled bags, but very soon they begin to expand and dry, and by dusk they are fully developed. The males take their first flight at this hour, but do not usually pair until the second flight at midnight. If the females have not mated by the third or fourth night they will start to lay infertile eggs. In commercial practice this must of course be guarded against, and a great deal of care is needed in looking after the insects in all their stages of metamorphosis.

Nowadays, as in the past, the bulk of the raw silk used for commercial purposes is produced by the common silk-worm *B. mori*, but there was a period in the history of silk farming when these beautiful wild silk moths assumed a vital importance and were seriously studied by sericulturists. This was in the early sixties of the last century, when the dreaded disease known as Pebrine threatened to exterminate the entire race of cultivated silk-worms. But for the intervention of Pasteur, who discovered the cause and the cure for the disease, silk producers might have had to fall back upon the vast family of wild silk moths for their supplies.

(Above) *The Ailanthus Silk Moth* was originally a native of China, but is one of the silk moths that has successfully been 'Westernized'. It belongs to a species that adopts a natural camouflage (below) by weaving small

E. F. Linssen



The Diffusion of Greek Culture

VIII. Byzantium and the High Middle Ages

by STEVEN RUNCIMAN

Those who teach history and classics commonly lay so much stress on our cultural debt to the 15th-century Renaissance as to obscure the fact that the stream of Greek influence on Western Europe, intermittent after the fall of Rome in the 5th century, became continuous long before the 15th. The earlier channels through which it flowed were described by Dr Taylor in our June and Mr Moss in our September 1946 numbers. The later ones are the subject of Mr Runciman's present article

THE turning-point of the Middle Ages was reached in the 11th century. In the West the last barbarian invaders had settled down to develop their extraordinary political genius in Normandy. Everywhere the old disconnected feudalism was giving place to a theoretic feudalism under the control of emperor or king. The Western Church was being effectively centralized under the authority of Rome. Comparative order and security were arising, and in consequence trade and wealth. In the East the Arab Empire was in disruption; and Byzantium was now the dominant power in Nearer Asia. The Balkan countries were Byzantine provinces. Thanks chiefly to the Byzantine navy, the Mediterranean sea was safe for merchant ships; and the cities of Italy were quickly taking advantage of it, while pilgrims from the West could travel now with very little risk to see the Holy Places in Palestine, and the great relic collections of Constantinople on the way. As a result of the merchants and the pilgrims, Eastern and Western Europe were brought more closely together than they had been for centuries, at a moment when the West was thirsting for civilization and Byzantine culture was showing its most triumphant fusion of oriental intensity and the classical tradition.

In the second half of the century the whole situation was changed. As so often happened before, the first rumblings could have been heard for some time previously, as the Turks overflowed from Turkestan, till by the middle of the century they had overrun Persia and Iraq, absorbing the Caliphate, and were soon to plunge into Anatolia, the heart of the Byzantine Empire. About the same time the last of the barbarians of the West, the Normans, orderly now and imbued with the most modern ideas of the time, embarked

on a career of expansion. While some of them invaded England others penetrated into Southern Italy and Sicily to found there a Mediterranean Empire, which saw in Byzantium its most dangerous competitor. Norman ambition, the temporary stoppage of the pilgrim traffic, the alarm of the Italian merchant cities, all combined with other political factors to induce the West to launch a counter-attack against the Turks, in the movement that we call the Crusades, which began as armed pilgrimages, continued as wars of colonial conquest and ended as defensive expeditions against the revived strength of Islam.

The Crusades, owing to the rapacity and jealousy of the Westerners and the over-subtle diplomacy of Byzantium, enormously increased the bitterness of feeling between Eastern and Western Christendom, particularly after the Crusader sack of Constantinople in 1204. But they inevitably made the cultural contacts between East and West still closer, and in spite of political hatred they remained close till the end of the Middle Ages. It is impossible to understand either the Renaissance of the 12th century in Western Europe or the later, better-known Renaissance without remembering them.

During the 11th century, when the Romanesque art and civilization of Europe was slowly building itself up, Byzantine influence was not able to have much effect on Western Europe outside of Italy, and even in Italy it was somewhat suspect. When the Greek-born Dogissa, Maria Argyra, introduced forks into Venice, the good Cardinal Peter Damian was horrified by such diabolical luxury. But in a few decades all well-to-do Italians were using forks. Apart from the extreme south of the peninsula, which remained Byzantine till the Norman



A 10th-century reliquary for the wood of the True Cross, looted from Constantinople by Heinrich von Uelmen, a German Crusader, in 1204 and preserved in Limburg Cathedral



conquest, Venice was the main door through which Byzantine ideas entered. There was a Greek colony there, which included artists and artisans, reproducing the work of the Imperial capital. In other parts of Italy Greek art and the Greek language were little known. Indeed, one of the main problems in the relations between the Eastern and Western churches was the invariable ignorance of Greek amongst the Roman delegates. But Italy could be influenced from Venice, or from Bari or Amalfi. In France or Germany or beyond, Byzantine influence had not—as yet penetrated far. Pilgrims might bring back an occasional architectural idea to copy, or relics enclosed in a Byzantine reliquary, which the enamel-workers of France and Flanders would try to emulate. Or an occasional holy man from the East would come westward with the pilgrims, men such as Simeon of Syracuse, who was educated at Constantinople and worked as a guide at Jerusalem and then accompanied some of his clients to Normandy, dying at last at Trier. It was at the close of the century that the growth of the Italian cities' trade, the establishment of the Norman kingdom in Sicily and the mass movements of the Crusades gave Byzantine influence the chance to expand more widely.

In the early 12th century Byzantine pictorial art dominated both Venice and Sicily. At Venice the cathedral of St Mark's, built on the model of the Holy Apostles at Constantinople a century before, was decorated by Greek mosaicists in the styles of the Capital. Still more successful was the decoration of the near-by cathedral of Torcello, the Madonna in whose apse is perhaps the loveliest of all surviving figures in mosaic. In Sicily the Norman kings likewise imported Greek mosaicists to ornament the walls of their palaces and churches, and even induced them to train a native school; whose work, however, as we see it in the later panels at Monreale, is of definitely poorer quality. The Normans eagerly encouraged Byzantine artisans to settle in Sicily; and if they did not come willingly they were abducted, as were the silk-weavers of Thebes and Corinth during the Norman raid on Greece in 1147. The Normans also studied Byzantine governmental methods and what they learnt was handed on to be part of the background of the new monarchies of the Renaissance. The Crusaders were on the whole men of a coarser calibre, less ready to appreciate what they saw and more anxious to keep their own fashions; but

The 11th-century Madonna in Torcello cathedral exemplifies the influence of Byzantine mosaicists on the early artistic development of Venice

amongst them were artists and art-lovers, who copied and patronized Byzantine art and absorbed its ideas. Crusader lords not only studied Byzantine engineering and strategy in the building of their castles, soon to be copied in the West; but we find them employing Eastern craftsmen, whose products often travelled westward. Amongst other works of art illustrated manuscripts were sent. Such manuscripts as the Psalter of Queen Melisend, made by Greek miniaturists for the Lorrainer queen of Jerusalem, had an enormous influence.

By the middle of the century this influence can be seen in many countries; in the illuminated manuscripts of England, where the books of Abbot Simon of St Albans or the later illustrations in the Winchester Bible are extraordinarily Byzantine; in the frescoes of France and Catalonia, such as those of Berzé-la-Ville or Burgal or Aneo; in the metal-work of Central Europe, such as the Golden Altar of Basle; and even in the early Mudejar architecture of Spain, with its particular type of exterior decoration. The figures over the porches of 12th-century Romanesque churches all over Western Europe show the same classical Byzantine descent.

In letters and thought the Byzantine



From the Psalter of Queen Melisend, British Museum

(Above) Crusaders founding kingdoms in the Near East encountered everywhere the higher culture of Byzantium. Products of Byzantine craftsmen employed by them often travelled westward, as did the Psalter made in the 12th century for Melisend, wife of Fulk, King of Jerusalem



(Left) Beside the front portal of St Trophime at Arles, completed in 1180, are figures that bear witness to the constant intercourse of southern France with the Greek East and to the classical Byzantine descent of much decorative detail in 12th-century Romanesque architecture

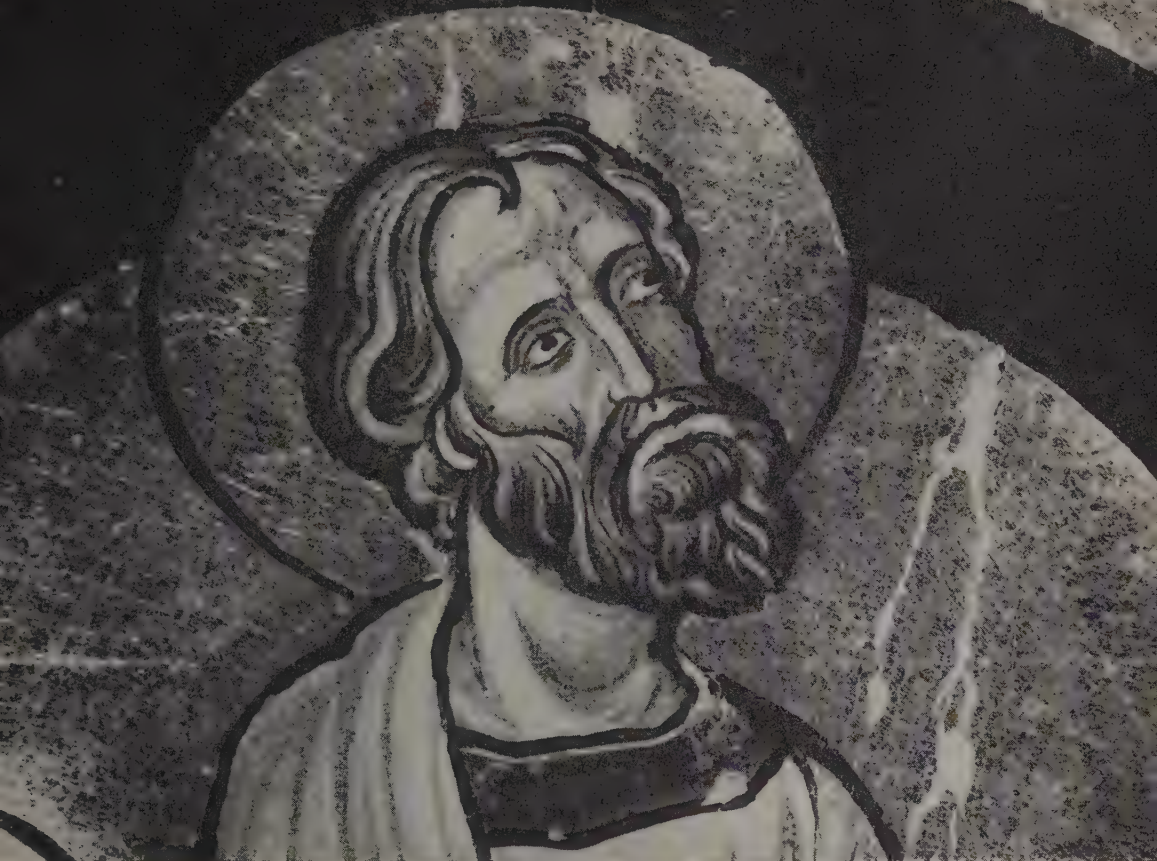


Alinari

The Norman kings of Sicily imported Greek mosaicists to ornament their palaces and churches. Sicilian artists trained by these Byzantine masters perpetuated an awe-inspiring dignity and uncompromising sternness, as shown at Monreale in the figure of Christ triumphant, ruler of the world

influence was less. The West still preferred to learn ancient Greek lore through Arabic intermediaries; though Byzantine practical achievements, as in medicine and engineering, were admired. Moreover, there was a dawning consciousness that Byzantium was in fact the heir of Greece, a realization, for example, that the Byzantine provincial city of Athens was still Athens, the old birthplace of learning. In the most usual version of the late mediaeval legend of Pope Joan, that lady, an Englishwoman by birth, had received her marvellous education at Athens; while the Englishman John of Basingstoke claimed to have studied natural science at the close of the 12th century at Athens, under the tutelage of the daughter of the Archbishop. Less orthodox thought was carried from Constantinople to Italy and France by heretical missionaries, who were, however, more often Armenian or Slav than Greek, though their heresy belonged to the old Greek gnostic tradition.

With the 13th century the situation changes again. Byzantium was sacked and parcelled out by Frankish adventurers early in the century and could not for a while radiate civilization. Fortunately the West no longer needed its help so badly, for Western culture was well enough established to work out its own development. But in the meantime a revolution had taken place in Byzantine art and culture. The history of Byzantine civilization is the history of a series of classical revivals; but the revival that began in the 11th and continued in the 12th century differed from its predecessors in its emphasis on Humanism. In art the serene intensity of the 10th and early 11th centuries, with its emphasis on Christ the God or on the Emperor as viceroy of the Eternal, began to give way to a poignant story-telling art with its emphasis on Christ the man and on human portraiture. Both styles are visible in the 11th-century mosaics at Daphne in Greece and in the 12th-



By courtesy of the Dean of Winchester

Among the decorations of the great 12th-century Winchester Bible, the later paintings show a marked Byzantine influence: for example, the portrait of the Prophet Habakkuk. Yet here we may detect a more human and individual approach to portraiture, accompanying a revival of classical tradition

century mosaics of Sicily. By the middle of the 12th century the newer style had triumphed. We can see it at its most moving in the frescoes of Nerez in Macedonia, which are almost unbearable in their depiction of human agony. At the same time there was a revived interest in ancient Greek philosophy, started by the 11th-century Psellus and his contemporaries, somewhat at the expense of dogmatic theology. The study of Mysticism did not die; some of the best Byzantine mystics were still to come; and in the 14th century the Hesychast controversy was to show that even under one of the most intellectual of all Byzantine emperors, John Cantacuzene, Mysticism could still fight a winning battle against Humanism. But the study of classical authors, never neglected in Byzantium, was given a new impetus; and whereas the Byzantine church had been a little inclined to suspect this classical revival in the 11th century, in the 12th century the neo-classical movement was led by such eminent

ecclesiastics as Eustathius, Archbishop of Salonica, and Michael, Archbishop of Athens.

This classical renaissance lasted in Byzantium till 1453. In the 13th century, when the Empire was in exile at Nicea, we find it represented by men such as Blemmydas, a cantankerous savant who travelled round the East collecting manuscripts. The two last centuries of the Empire, from the recapture of Constantinople from the Franks in 1261 till its fall to the Turks in 1453, were politically decadent and disastrous; but intellectually and artistically they formed a period of exceptional brilliance. Perhaps the political disasters even helped on this culture; for the Empire was soon reduced to a few coastal cities and districts and parts of Greece itself, the provinces of the Empire where the Greek blood was purest. The art of these centuries is humanistic and fresh, looking back to the Hellenistic past and forward to the Italian Renaissance. Above all, the manuscript illustrations, which by their mobility were more

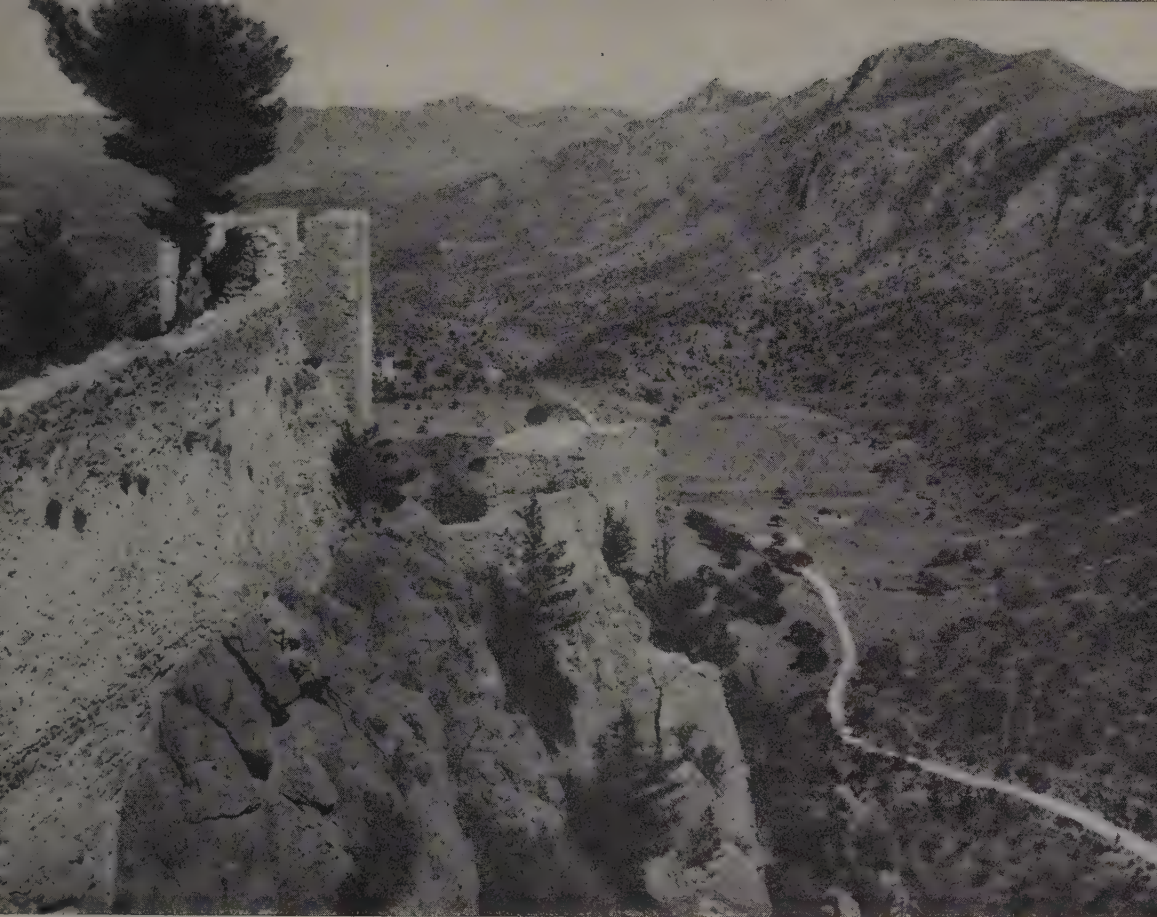
influential than any other form of art, are in the strongest Hellenistic tradition. In letters the interest in classical learning remained high and stimulated real activity in philosophy, amongst such men as Theodore Metoechites or Nicephorus Gregoras, or, most remarkable of all, the neo-Platonist, George Gemistus Plethon, who taught at Mistra in the Peloponnese on the eve of the Turkish conquest a system that is still striking for its originality and daring. Even in political matters we find a curious harking-back to classical times, as in the movement of the Zealots of Salonica, a movement inspired partly by the grievances of small mediaeval tradesmen against monopoly and privilege and partly by memories of ancient Greek democracy.

All this activity was not unnoticed by Western Europe. The establishment of Frankish principalities in Byzantine lands after the Fourth Crusade meant a continuous passage of Westerners to and from Greece; and in the courts of the Dukes of Athens or the Princes of Lesbos, or, above all, the Kings of Cyprus, a curious Graeco-Frankish culture grew up, echoes of which reached the West. Sometimes this connection had curious effects, such as the assumption by the English royal family of the title of Duke of

Clarence, which is Khelmoutsa in the Peloponnese, a title acquired through the kinship of Edward III's queen with the Frankish princes of Achaea. The political importance of the Eastern Mediterranean from the 13th to the 15th century made the Western Mediterranean powers very conscious of Greece and Byzantium; while the Greek export trade of currants, carpets, cotton and kermes-dyes and wines such as the Malmsey or Monemvasia in which a later Duke of Clarence was drowned, made contemporary Greece better known. The Emperor Frederick II, as heir to the Sicilian Normans, employed Greek officials and copied Byzantine governmental methods; and his family had many connections with the Greek dynasties across the Adriatic.

By the 14th century Byzantine art and learning was appreciated by Western contemporaries. To what extent late Byzantine pictorial art had an influence on early Renaissance art in Italy is still a controversial question; but that some such influence was exerted is undeniable. Venetian art had a long Byzantine tradition; and a century after the fall of Byzantium the tradition was carried further to the West by the great Cretan Domenikos Theotokopoulos,





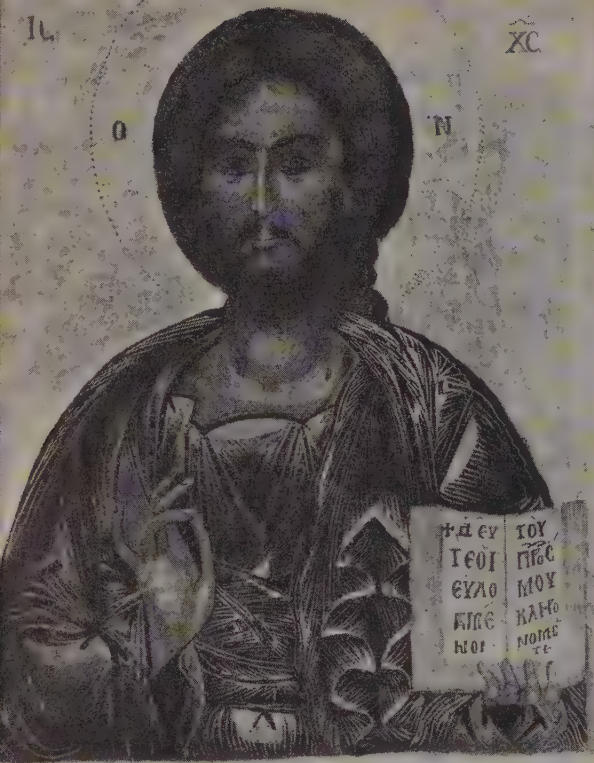
Ralph Keene

Cyprus, a Byzantine proconsulship till 1184, was in the hands of a rebel 'Emperor' when it was captured by our Richard I in 1191. Here he married Berengaria of Navarre, who from the Castle of Hilarion may well have surveyed this dry and distant part of his domains, which he soon abandoned

surnamed El Greco. In learning the influence is clearer seen; for we know the names of many Byzantine savants who went to teach in Italy, both before and after 1453, men such as Varlaam of Calabria, who vainly tried to teach Petrarch Greek: Chrysoloras who taught in the schools of Florence: the theologians who accompanied the Emperor John VIII to the Council of Florence: the cultured Emperor Manuel II himself, who journeyed as far as England seeking for help against the Turks: and the refugees like Bessarion and Chalcocondylas who crowded to Italy after the final disaster. But their rôle is part of the history of the Renaissance.

Thus the part played by Byzantium in the High Middle Ages in inspiring Western Europe was two-fold. In letters and philosophy she continued her ancient rôle of preserving and propagating all that she had

inherited from her classical Greek past; and her propagation was the more effective because of the genuine brilliance of her own last classical revival. In the arts, where she showed her finest creative triumphs, her influence on the Western Europe of her day and especially on Italy at the very eve of the Renaissance was enormous and profound; while after her death her great descendant El Greco carried it on, to invigorate centuries later the painters of modern Europe. For her conservation and development of those dynamic classical and Christian traditions that are the basis of our European civilization we should all be grateful to that ancient long-lived Empire, which, in the words of one of its later writers, so often "put on new raiment and appeared as a young maiden", as is the way of cultures dependent on the inextinguishable genius of Greece.

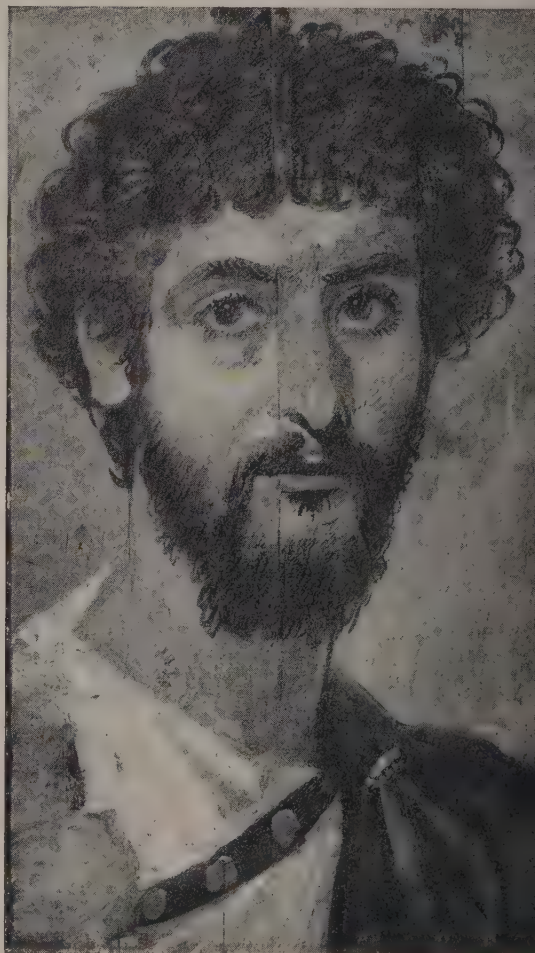


A hallowed panel, painted on gesso over linen on wood (left), depicts Christ as Lord of All holding an open gospel, the right hand raised in blessing. This panel, in my collection, is described by Paul Muratoff as "spacious, with a fine pictorial effect . . . an extremely fine painting". He dates it about A.D. 1100 and regards it as close to the work of the painter of 'Our Lady of Vladimir', the most celebrated extant Byzantine painting, taken from Constantinople to Russia. According to another view the panel is rather later than this date. Though more formal than the Eton portrait it is strangely akin in temperament.

An Enduring Tradition

by CHARLES SELTMAN

The splendid panel portrait (right) of a bearded man in white tunic and purple cloak was painted by a Greek in Egypt and is now in Eton College. The general style and technique is so close to that of the portrait of Proculus, Master Baker of Pompeii, painted in A.D. 78 to 79 that we can confidently date the Eton portrait in the first century of our era. This peculiarly 'Mediterranean' method of painting must actually be much older; and, if panel portraits of 300 B.C. had survived, we should expect to find in them also the same mannerisms which this and the four following paintings display.

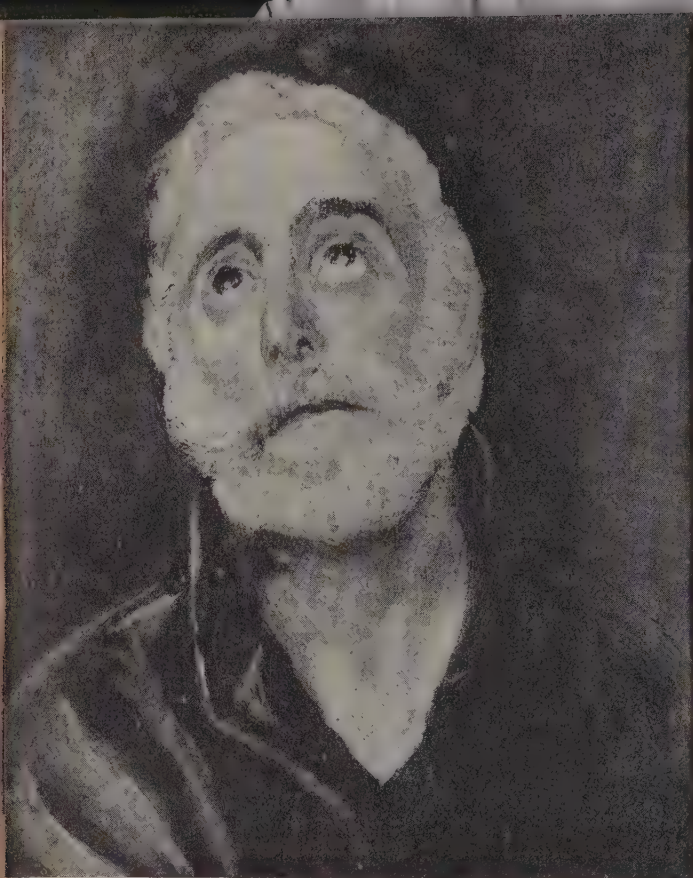


By courtesy of the Provost and Fellows of Eton College



A large panel signed by Emmanuel Tzanes of the Cretan School and painted about A.D. 1680 presents imaginary portraits of Saints Cosmas and Damian. The tradition is maintained; their faces are Hellenistic Greek

National Gallery



National Gallery

(Left) *Domenikos Theotokopoulos*, commonly known as *El Greco*, shows in most of his work an unmistakable debt to the Greek-Byzantine tradition of painting, which he learnt in his youth before ever he went to Italy or Spain. This is clear, despite the upward tilt of the face, in the little *Head of St Peter* in the National Gallery, a canvas painted about A.D. 1590. *El Greco*'s Greekness was the justification for including six of his works in last year's *Exhibition of Greek Art* for which I was responsible as Director, and which a colleague and I will shortly be recording anew in a fully illustrated volume to be published by *Faber & Faber*

F. Contoglou

(Right) Visitors to that exhibition may remember paintings by Contoglou, a modern Greek deep in debt to his ancestors in Greek Alexandria and Constantinople. He is no more an archaïser than was *El Greco*, but a man absorbed in and by the 'Mediterranean' way of painting. This portrait of a young Thessalian shepherd painted in 1945 is very satisfying, because it carries the marks of an ancient tradition simultaneously with a certain romantic intensity of youth. Here is a sleepless watcher by night, a leader of such young mountaineers as fought beside Byron and have still fought in our own day for a very ancient cause—Liberty



Animals in the Kruger National Park

by J. STEVENSON-HAMILTON

According to their time-table, the Royal visitors to South Africa should be entering the Kruger National Park towards the end of the present month. Some of the animal characters that they will probably encounter are described in the following article by Colonel Stevenson-Hamilton, who was Warden of the Park from 1926-1946 and of the Transvaal Government Game Reserves from 1902-1926

CREATED by Act of the South African Parliament in 1926 as a permanent sanctuary for wild life and as a place for the recreation and instruction of the people of the Union of South Africa, the Kruger National Park grew from the Sabi Game Reserve established in 1898 by the Government of the Transvaal Republic at the instance of President Kruger. It is the largest and in many respects the most striking permanent refuge for wild life in the continent of Africa and indeed in the world. The map on page 506 gives some idea of its size by superimposing it on England. It covers over 8000 square miles of bush country in the north-eastern corner of the Transvaal Province, bounded on the north by Rhodesia and on the east by Portuguese East Africa.

I do not propose, in this short article, to deal with either the administrative problems of the Park or the facilities it affords to visitors; but its growth as a place of resort may be judged from the fact that while in 1928, when it was opened to the public, 800 persons were admitted, this number had increased in 1938 to 38,000.

The Park contains a vast assortment of indigenous beasts and birds of all kinds, which through long immunity from persecution have to a great extent lost their fear of man, and pay not the slightest attention to motor traffic at the closest quarters. After the lion, the hippo, the elephant and the giraffe appear to be the most popular animals, but all of them rank a good long way behind the so-called "king of beasts". One of the camp officers noted down the first inquiry made to him about animals by each succeeding tourist during a whole day. 75 per cent said "Where are the lions?" 15 per cent, "Shall we hear lions tonight?" and 10 per cent, "Which is the way to the hippos?" Had it been in the elephant country the name of this animal might have been substituted for "hippo".

Truth be told, the elephant is far more

deserving of the royal title than the lion, which invariably gives way hastily in the presence of the huge pachyderm. The intelligence of elephants is well known; undoubtedly they possess considerable reasoning power which shows itself in a multitude of ways. Their sense of sight and in some degree of hearing is deficient. It is doubtful if an elephant can distinguish the exact nature even of a moving object at thirty yards; on the other hand their sense of smell is extraordinarily acute.

In the Kruger Park, the old bulls, who wander about solitary or in groups of two or three, have become exceedingly tame and pay little or no regard to the presence of motor cars. Like all more intelligent wild animals, elephants are both curious and mischievous, and at the end of each season the road signs in the country frequented by them have to be collected and stored, since a travelling elephant seldom loses the opportunity of pulling down and destroying any stray notice that he happens to observe as he wanders along. The large herds containing the females and young are shy and keep away from the roads; which is fortunate, since the former might react dangerously did they suspect any threat to their children.

Hippos occur in all the larger rivers of the Park and in some of the smaller ones. If their haunts are visited from sunrise up to about 10 A.M. during cold winter mornings, they may often be seen out of the water sunning themselves on the sand. At other times it is usual only to see their protruding heads. After nightfall they land and seek their food among the reeds and grass bordering the rivers and water-courses.

The story is told of an American who, on first being shown a giraffe, exclaimed, "Well, I simply don't believe it." In fact it is an amazingly shaped animal, with its steeply sloping back, enormously long neck and queer stumpy horns. Giraffes are found only

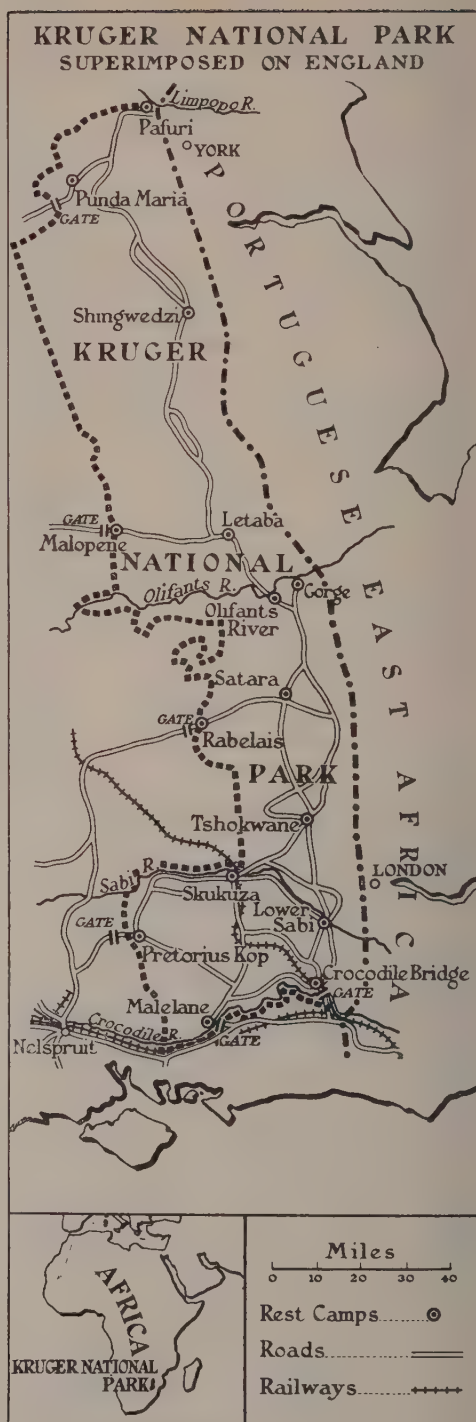
in acacia country in the Park, where they twist off and chew the thorny twigs of these trees with great apparent enjoyment. That is why they are so rare north of the Olifants River where the *mopani* tree predominates. Giraffes have steadily increased from a few score forty years ago to thousands at the present time. They occasionally fall victim to lions, but their thick hides, great strength and the deadly kicks they can deliver with both fore and hind legs, make them a dangerous form of prey to seek. Therefore they are to a great extent unmolested; and when they are attacked it is only a considerable pride of lions which ventures to do so.

The Park contains seventeen species of the antelope tribe, large and small, varying from the great eland to the tiny Natal duiker. Some, like wildebeeste, are purely grazers; some, like kudu, purely browsers; others, the impala for instance, favour a mixed diet.

The dignity of bearing of a full-grown male sable, his shining coat a vivid contrast of black and white, and his magnificent horns curving far over his back, is hard to beat; though there are some who look on a big kudu bull as his equal if not his superior. Certainly the kudu's bulk and his remarkable spiral horns give him a most impressive appearance, and it is interesting to note how, these great horns laid flat back, he is able to dash at full speed and without apparent effort through the thickest bush.

The blue wildebeest, so called to distinguish it from its relative, the nearly extinct black wildebeest of the high-veld, is the most numerous of the larger antelopes existing in the Park. It prefers rather open bush country, and shuns dense jungle. It consorts, preferably, in herds of up to thirty or forty individuals, usually cows and immature animals with an attendant herd bull; but old solitary males and considerable groups of young bachelors are common. Wildebeeste are queer freakish creatures, and invariably take to flight with much tossing of heads, waving of tails and violent shying off from imaginary obstacles. In the neighbourhood of Pretorius Kop, where long immunity has caused them entirely to disregard the presence of motor traffic, they may be seen lying down near the roadside or grazing quietly, like cattle, within a few yards of it.

The handsome and rare nyala is a larger relative of the bush buck, and is at present confined to the northern portions of the Park, although isolated specimens have been noticed so far south as the Sabi River. Nyala, unlike their bush buck cousins, are mainly diurnal





H. M. Swa

"Where are the lions?" In the Kruger National Park the answer probably is: "Round the next corner"!



P. W. Willis, from Paul Popper



The giraffes that stalk through acacia country in the Park have increased from a few score forty years ago to thousands at the present time
P. W. Willis, from the author





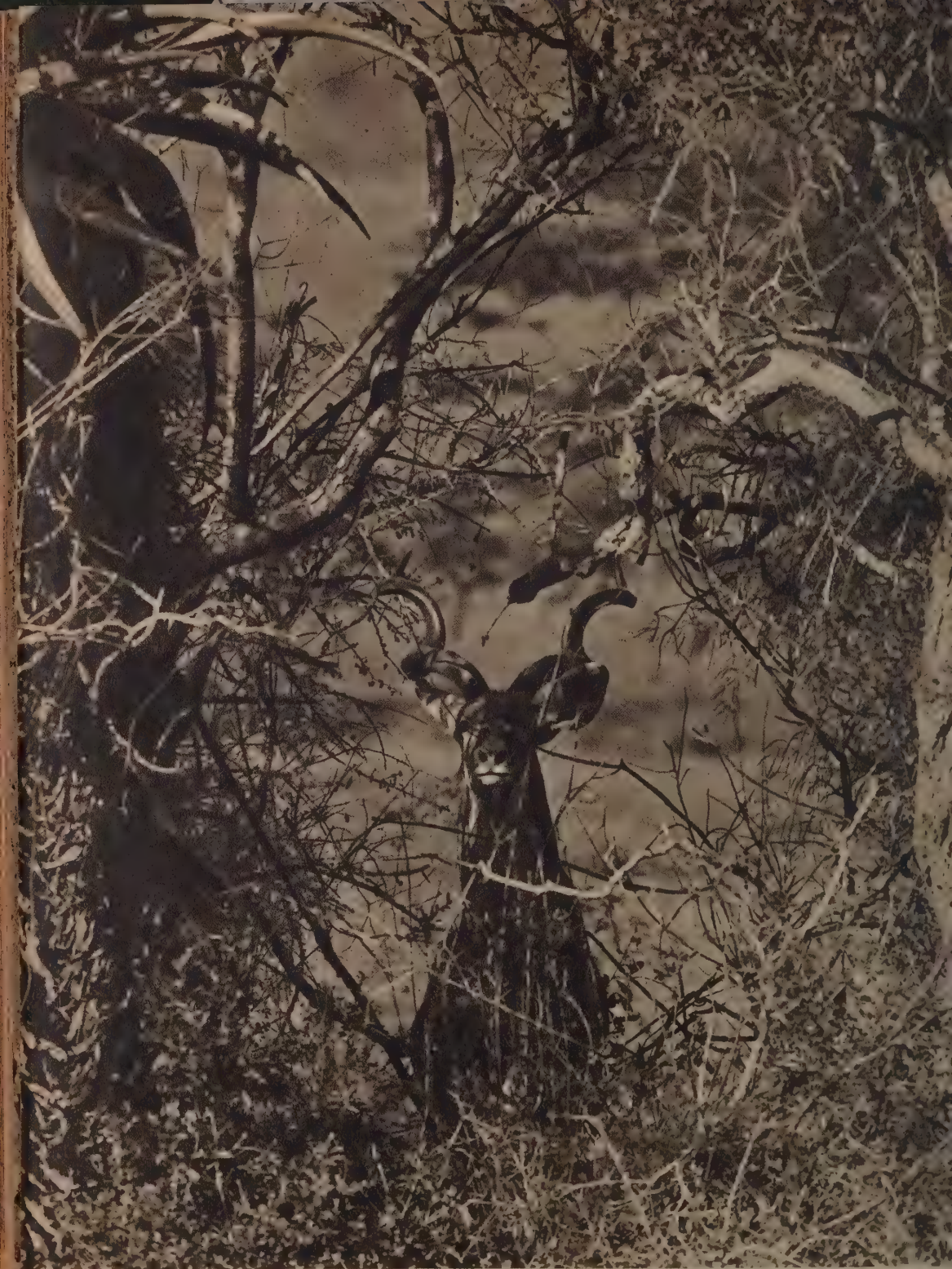
Common though he is in all the Park's larger rivers, a full view of the hippo is unusual except early on cold winter mornings

P. W. Willis, from Paul Popper





—presents a striking contrast to the grotesquely disproportioned head of the wildebeest and the strange protuberances on the warthog's face
P. W. Willis, from the author



Paul Selby

The thickest bush will not hinder the kudu from dashing off, when alarmed, with horns laid flat back

in habit, and within their favourite haunts are readily seen by visitors.

By far the most numerous antelope in the Park is the impala. It is found wherever exists any of the acacia scrub whose leaves and fruit form an important constituent of its diet. Impalas are among the most graceful of the antelopes; the rams carry handsome lyrate horns, and the leaping powers of the species must be seen to be believed. They frequently consort in immense herds of 200 or more, usually consisting of females and adolescents, with a sprinkling of adult males.

The wart-hog has the popular reputation of being the ugliest animal in Africa. Of course ugliness is a relative term, and I think generally implies a departure from the ordinarily accepted standards of beauty. To this implication the wart-hog certainly conforms; his long face with its small eyes and the huge protuberances that grow from it do give him an unusual appearance, but personally I should prefer the term 'strange' to that of 'ugly'. People are always amused to see wart-hogs moving off at their animated trot, each with his tail stiffly perpendicular, the tassel at the end forming an acute angle with the rest of the appendage.

The zebras in the Park are the Chapman variety of the common Burchell zebra. They are distinguished from the Grant variety of the same species, found in East Africa, by their possessing brown 'shadow' stripes between the alternate black and white markings; and they are not always striped down to the fetlocks.

Baboons are well known all over South Africa, but everywhere outside the Park they have made themselves so unpopular by the damage they do to cultivated land, that they are completely outlawed, and thus there exists much less opportunity for studying their domestic habits than in places where they are unmolested. Like the other members of the Primate family, which includes man himself, baboons have little sense of smell, thus differing profoundly from most other wild animals, which depend upon this faculty as their main line of defence or attack. On the other hand, baboons' senses of sight and hearing are amazingly acute, and they are by far the most intelligent of all the Park's wild animals. In fact, the longer one contemplates, unobserved, a band of them, each member going about its ordinary business unperturbed, the more one is struck by the essentially human traits appearing in their social life. The mother scolding or chastising her offspring, but protecting it from the wrath of the male parent rightly or wrongly incurred; the squabbles between the juveniles; the careful posting of look-outs and the punishment of

such sentries as are considered to have failed in their duty; the coordination displayed when danger threatens; the assistance given to companions injured or in trouble; the determination never to take anything for granted where there seems the faintest hint of risk—all these serve to rank the reasoning power of the baboon far above that of any other local animal, not excluding the elephant.

I would place, in the matter of general intelligence, the lion third on the list. They are cats and possess in pursuit of their prey the crafty instincts of that family; but they also show a genius for cooperation, and display certain mental attributes which we are accustomed to associate with dogs rather than with felines. For instance, in captivity they definitely become attached to certain persons they know, dislike others, and resent strangers. They retain their memories of individuals as clearly as do dogs, and they are not naturally treacherous. Dr Hornaday, for many years curator of the New York Zoological Park, gave it as his considered opinion that "the lion is the most dependable of all wild animals in captivity".

Predatory animals have necessarily to be more intelligent than the herbivora upon which they prey; they must ever be exercising skill and craft to get the food necessary for keeping themselves alive, a task which to the vegetarian animals is a less arduous one, since their food, if sometimes scanty and difficult to find, at least does not evade them by flight and cunning. So the wits of the carnivora develop proportionately to their difficulties; and usually the more intelligent an animal is the easier it will be to handle and deal with in captivity, if caught sufficiently young.

The antelopes, as a race, have limited brain-power and outside the primitive instincts connected with food, sex and safety, seem to possess little mental horizon. In captivity they are often unreliable and dangerous and lacking too in any sense of discrimination between persons. This does not of course imply that under natural conditions they fall easy victims to their enemies. Quite the contrary. Their senses, especially that of scent, are abnormally acute and they know by instinct what are dangerous and what are safer places to seek food and water. They fully understand the advantages of taking cover and under certain circumstances of maintaining complete rigidity in face of an enemy. But beyond the exercise of the devices essential to preserve existence, to continue the species and to select the most nourishing food, the antelope tribe display few indications of what we might reasonably term intelligence.

Market-Day in Cheng Kiang

Notes and Photographs by JOHN GUTMAN

Market-day in China's towns is a 'high light' both financially and socially. In Cheng Kiang, in the Province of Yunnan, peasants, farmers and traders from the neighbourhood have been driving up since early morning, their carts packed with goods which they have accumulated for sale. Passing through the pagoda-like gate on the outskirts of the once walled city, they enter into the market, a large area specially reserved, where wares are displayed free of charge. All through the hot day incalculable numbers of people throng amidst a profusion of goods—vegetables, fish, tea, fruit, cloth, trinkets, rope, straw hats, straw baskets and the inevitable rice. And if anything is still unsold by nightfall, gaily coloured lanterns are lit and business continues at full swing





The milling crowd: buyers and sellers mingle inextricably, all looking alike in their skull-caps or wide straw hats. But closer scrutiny reveals slight differences in the shapes of these hats, for each district has its own characteristic model. They are worn by both men and women and afford protection in sun or rain



(Above) One woman has set up a stand displaying silver hand-wrought jewellery, which Chinese craftsmen have made for many centuries—fine work, inviting close inspection by the soldiers. (Below) Near the market is the parking-place where wares are unloaded and the mules and water-buffaloes keep patient vigil until business is finished. Meanwhile peasants pass by intent on shopping, with baskets strapped to their sturdy backs





"Now do I really need it?" . . . The street that leads to Cheng Kiang's market is also lined with stalls, some of them shaded from the sun with awnings and umbrellas. The woman carrying her basket with a shoulder-strap keeps cool with yet another variety of hat: a tight turban over which a straw wheel serves as a parasol



All photographs from Pictorial Press

In a quieter corner of the market a vendor has displayed some trinkets on the ground, a woman weaves nets out of rope while waiting for someone to buy a basket and a girl spends some time choosing just the right straw hat. People are all intent on business; but the young colt has a mind for only one thought—his dinner

Exploring the Deep Sea I

by Dr F. D. OMMANNEY

In the following article Dr Ommanney, who has been associated for many years with oceanography and particularly with the work of the Discovery Committee, surveys the development of that science in its earlier stages, especially the great charting and collecting voyages of the 19th century. A later article will describe some of the problems encountered and methods employed by oceanographers in their "systematic study of the sea as an environment for a rich and varied living population"

THE science of oceanography is the study of the sea in all its aspects. It includes the chemistry and physics of sea water, the geology and past history of the oceans and of the sea floor, and the study of water movements, currents, tides and waves. And, since the sea is a realm of life as populous and as complex as the dry land, oceanography must deal with its natural history from every angle.

The earliest Greeks believed that the world was a flat disc. It consisted of the habitable world as then known, in the middle of which, like a great lake, lay the Mediterranean Sea. They referred to this always as *Thalassa*, meaning simply "the sea", as opposed to *Okeanos*, the Father of Rivers, which flowed perpetually round the margin of the habitable world. It was Herodotus, the historian (c. 484-425 B.C.), who abandoned the idea of a river flowing round the earth, and Aristotle (384-322 B.C.) and Pythagoras who first suggested that the world was a sphere. To Aristotle, the Father of Science, we owe the first purely scientific inquiries into the natural history of the sea. He compiled a list of 180 species of marine animals, including the sea urchin. To this day the beautiful and complex system of levers around the mouth of the sea urchin is known as "Aristotle's lantern". He noted the saltness of the sea and that the water was warmer and more salty at the surface than at the bottom owing to evaporation. From this cause, he thought, the sea must one day dry up. Pliny the Elder (A.D. 23-79) also observed the saltness of the sea and held that it must one day dry up.

He made a catalogue of 176 marine species, four fewer than Aristotle had listed, but was so pleased with and so convinced of its completeness that he wrote—"And yet, by Hercules! in the sea and in the ocean, vast as it is, there exists nothing that is unknown to us".

The classical period in the history of the science of the sea really ends with Ptolemy

From a map of the North Atlantic by Lafreri illustrating the work of Olaf Magnus (1572), Archbishop of Upsala, Histoire des Pays Septentrionaux, in which he described the horrible monsters inhabiting the seas off the coast of Norway





John Ross "A Voyage of Discovery of a North-West Passage"

H.M. Ships Isabella and Alexander, under Captain Sir John Ross, R.N., meeting eskimos on the coast of Greenland, August 10, 1818. "They were instructed to uncover their heads, as a mark of respect and goodwill to us, and with this ceremonial . . . our friendship became established"—Sir John Ross

the Astronomer (c. A.D. 150), whose ideas persisted until the time of Columbus. In the 15th and early 16th centuries there was a great outburst of geographical discovery, largely due to the Renaissance, which added a whole hemisphere to the Western world, together with a new ocean and a new route to India. All these, however, were voyages of exploration in the strict geographical sense. It was not until nearly the end of the 17th century that interest in the sea itself, for its own sake, began to revive. In 1699 Richard Boyle wrote a paper "On the Saltness of the Sea" in which he put forward the modern theory of its origin. Further, he noted that the density of the sea varied in different parts of the world, and it was about this time that the phosphorescence of the sea also attracted attention.

In the 18th century there was a revival of interest also in the living creatures of the sea, which had slept since the time of Pliny. It led to the use of the first naturalists' dredge by the Danish naturalist Otto Müller in 1779. This was a net with a square iron frame which he used in thirty fathoms off the coast of Denmark. In 1805 the French naturalist Péron made the first speculations about the relation of life in the sea to its surroundings. He arrived at some remarkable conclusions. He took temperatures at various depths and noted a decrease downwards, and from this judged that the bottom of the sea must be covered with eternal ice and that

no life could possibly exist there.

Perhaps the most important step forward took place when the Admiralty adopted the practice of sending naturalists out in naval surveying ships. Captain James Cook (1728–1779), who was a true scientist as well as a great sailor, began this by taking Sir Joseph Banks, the famous botanist and later President of the Royal Society, on his voyage to observe the Transit of Venus in the South Pacific in 1762. From that time onward expeditions ceased to be merely voyages of superficial exploration. They became scientific as well and very many of them were accompanied by naturalists. The era of polar exploration was beginning and expeditions went north to seek the North-West Passage, a navigable trading route from Europe to Asia round the north coast of Canada; while others sailed in different directions with various motives such as the discovery of the poles themselves. All these made great contributions to science, and particularly to the science of the sea, even if they did not always achieve their primary object.

In the middle of the 19th century the development of the submarine cable, especially that between Europe and America, gave rise to the need for detailed charts of the ocean floor so that great improvements in the methods of taking soundings came about. Magellan in 1519 had attempted a sounding in the Pacific but his short line failed to reach the bottom so he concluded he was sail-

ing over the deepest part of the ocean. The first recorded sounding was made by Ellis in 1749 off the North-West coast of Africa and in 1752 Philip Buache introduced the idea of drawing lines of equal depth on ocean charts to indicate the contours of the sea bottom.

In 1818 Sir John Ross made his first voyage in H.M. ships *Isabella* and *Alexander* through the Davis Strait and Baffin Bay to find the North-West Passage. On September 1, 1819, he made a correct sounding in Possession Bay down to 1000 fathoms. He used a new apparatus which he had devised called the "deep sea clamm", which was a kind of dredge that brought up samples of mud from the sea bottom. In Baffin Bay he brought up from 1050 fathoms a sample of mud containing worms and "a beautiful Caput-Medusa", so that Péron's theory that the bottom of the sea was covered with ice and that no life could exist there was proved to be incorrect. Sir John Ross's expedition was the first to take satisfactory soundings and bottom samples. In 1829 he made another voyage in the *Victory* and spent four winters in those inhospitable regions, during which he discovered the North Magnetic Pole and made a collection of marine animals. However, the *Victory* had to be abandoned and the whole of the collection was lost.

In 1831 Charles Darwin, then a young man, sailed on the famous voyage of H.M.S. *Beagle*. He was not specially a marine biologist but it was during this voyage that he

became interested in barnacles, which later formed the subject of his famous monograph. Darwin's chief contribution to the study of the sea was the theory of the formation of coral reefs, which he conceived during this voyage and which became the subject of one of the great biological controversies of the late 19th century. On this voyage also Darwin's keen perception found much of the evidence for those theories of evolution by natural selection and survival of the fittest which he put forward in the *Origin of Species*. His great champion, Thomas Henry Huxley, sailed in 1846 as surgeon-naturalist in H.M.S. *Rattlesnake*.

In 1838 Captain Wilkes led a United States Government survey expedition to the Antarctic with the Danish naturalist Dana on board and made some soundings in shallow water using, for the first time, copper wire. A year later the first great voyage of scientific exploration in the Antarctic began when Sir James Clark Ross sailed with Her Majesty's ships *Erebus* and *Terror*, carrying Sir Joseph Dalton Hooker, the famous botanist, as assistant surgeon. It was these same ships which were later lost when Sir John Franklin made his tragic attempt to find the North-West Passage. The expedition of Sir James Clark Ross was the first to make soundings in the open ocean. Lack of a proper line led to nothing but failure at first; but later a line was devised which had swivels in it at intervals so that it did not twist, and with this a sound-

H.M. Ships Erebus and Terror, under Captain Sir James Clark Ross, R.N., in a gale in the Antarctic pack ice, January 20, 1842. "The awful grandeur of such a scene can neither be imagined nor described, far less can the feelings of those who witnessed it be understood"—Sir James Clark Ross

Sir J. Clark Ross "A Voyage of Research and Discovery in Antarctic Seas"



ing of 2425 fathoms was made in the open South Atlantic Ocean. Another was made west of the Cape of Good Hope in 2677 fathoms. Many observations of temperature and density were taken down to 2000 fathoms; but since in those days thermometers were not protected against the enormous pressures at great depths, all the readings were false. Dredgings were also made in 400 fathoms, bringing up many of the same animals as had been taken from similar depths in the northern hemisphere; and it therefore came to be believed that in the open sea, below a certain depth, there was a uniform temperature of 39° F. right down to the bottom in all latitudes.

The voyage of the *Erebus* and *Terror* was followed by many others towards the polar regions, made by explorers from all countries, in the 19th and the first part of the 20th centuries. The Arctic and Antarctic became fields of high endeavour and heroism, rich with names such as Franklin, Peary, Scott, Amundsen, Nansen and Shackleton that still ring in the ears of their countrymen.

In the study of the sea, as, in fact, in so many other branches of human activity, the Victorian age produced a succession of great figures who were pioneers in a true sense. One of these was Edward Forbes (1815-54), a Manxman by birth, who, though he died at the early age of thirty-nine, left his mark on marine biology and is remem-

bered not only for his own work but for the enthusiasm he inspired in others. When a medical student at Edinburgh, Forbes spent his summer vacations dredging in the Irish Sea and exploring the coast of the Isle of Man. In 1839 he went on a dredging expedition with his friend John Goodsir, the anatomist, in the waters around the Shetlands. The British Association was so impressed with his results that it set up a 'Dredging Committee' for "the exploration of the sea by means of the dredge", which carried on its investigations for many years. Soon afterwards Forbes became friends with a wealthy Liverpool merchant, Robert MacAndrew, who combined an enthusiasm for yachting with another for molluscs. With him Forbes and Goodsir went dredging from the Shetlands to Cornwall. In 1841 Forbes was appointed naturalist in H.M.S. *Beacon* during a surveying voyage to the Mediterranean, and in the Aegean carried out dredgings down to 200 fathoms. Today Forbes' dredging work is perhaps remembered more for the enormous interest it aroused than for the truth of the deductions which he made from it. Many of these, indeed, were later disproved by the very researches they stimulated. Forbes mapped out a vertical distribution of marine animals according to depth and distinguished several zones. There was a littoral or shore zone, a Laminarian or ribbon weed zone, a Coralline zone and so on.

Men of H.M. Ships Erebus and Terror taking a sounding off Ascension Island. This expedition was the first to take deep soundings in the open ocean. "On June 3rd . . . being nearly calm and the water quite smooth, we tried for, but did not obtain, soundings with 4600 fathoms or 27,600 ft"

Sir J. Clark Ross "A Voyage of Research and Discovery in Antarctic Seas"

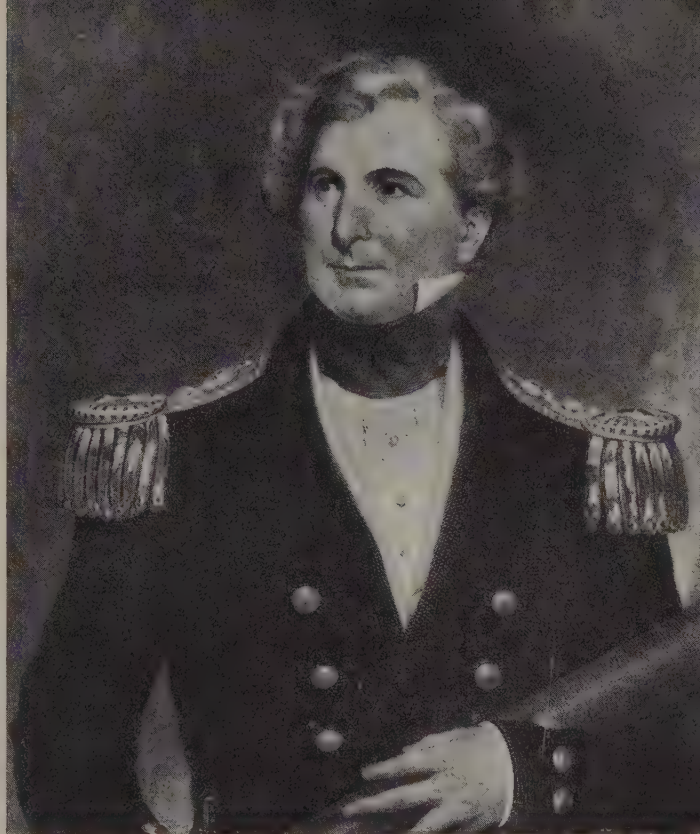


Below 50 fathoms he believed there was no vegetable life in the sea, and lower still, at about 300 fathoms, there was a limit to animal life also. Below the 300 fathoms line the sea was lifeless. The intense cold, darkness and gigantic pressure, anyhow, must make life impossible, he thought. Further, he drew attention to the fact that the shellfish found in his deepest dredgings all belonged to types hitherto only known as fossils.

All this aroused enormous interest among naturalists. Was there a lifeless zone in the depths of the sea or did life burn dimly there also in the stillness and the cold? If so, what was it like? And was there an ancient, archaic and ancestral population deep in the sea waiting to reveal the secret lineage of creatures higher up?

In 1843 Sir James Clark Ross returned from the Antarctic having dredged successfully in 400 fathoms and found abundant life. Unfortunately his collections were all lost, but it seemed already that Forbes' lower limit of life in the sea must be too shallow. In 1860 the *Bulldog*, under Sir Leopold McClintock, was surveying the northern cable route from the Faeroes to Iceland, Greenland and Labrador. She brought up starfish on the sounding line from 1260 fathoms. It seemed incredible that life could exist at such depths and many naturalists held that the starfish had "convulsively embraced" the wire on the way up. But in the same year a cable raised from 1200 fathoms in the Mediterranean was found to be covered with a mass of marine life. Further, samples of "Atlantic ooze" brought up from great depths, when examined under the microscope, were seen to be made up of the shells of dead microscopic animals and plants. How did they get there? Did they live on the bottom? And how would animals feed in those barren, cold and silent depths?

In the jars in which specimens from earlier dredgings had been preserved it was noticed that there was sometimes found a gelatinous formless mass of some grey substance. From this there arose the myth of the "Bathybius"—literally "the deep life"—and it was supposed that on the floor of the sea great undifferentiated masses of protoplasm crawled about like gigantic amoebae. These formed a kind of pabulum on which bottom-living



From a Portrait by H. W. Pickersgill, R.A.

Captain Sir James Clark Ross, R.N., who led the first great voyage of scientific exploration to the Antarctic with H.M. Ships Erebus and Terror from 1839 to 1843

animals fed. The myth persisted until the time of the Challenger Expedition when it was discovered that the gelatinous masses, which had been found in the early dredgings, were nothing more than a precipitation product which resulted from adding sea water to the alcohol in which the specimens were preserved.

The mantle of Edward Forbes fell upon the shoulders of another great figure of Victorian natural history, Sir Wyville Thomson, Professor of Geology, Zoology and Botany at Belfast. Thomson was intensely interested in marine life, collecting extensively on the shores of the Firth of Forth and dredging off the coast of Ireland. In 1866 he visited Professor Michael Sars at Christiania—Oslo, as it is now named—who, with his equally famous son, Ossian, had been dredging in the Lofoten Fjords, using only a small boat with three men to help him. He had brought up from over 300 fathoms a collection of rare animals, some of them resembling the now extinct fossils of former geological periods. He also found signs of abundant life below 450 fathoms.



This inspired Thomson and his friend, Dr W. B. Carpenter, to persuade the Admiralty to put a small surveying ship at the disposal of a scientific committee. Accordingly, in 1869 H.M.S. *Lightning*, and in 1869 and 1870 H.M.S. *Porcupine*, were equipped and sent out with Thomson and Carpenter, and later Dr Gwyn Jeffreys, to explore the Atlantic depths from the Faeroes to Gibraltar. The *Lightning* was a "cranky little vessel" and scarcely seaworthy and she had bad weather during most of her cruise. "We had not good times in the *Lightning*", Thomson wrote. Nevertheless she dredged down to 600 fathoms. But in the *Porcupine*, which was a better ship, they took successful hauls from 2435 fathoms. Sixteen hauls were made from depths below 1000 fathoms and life was abundant in all of them. So it was evident that Forbes' limit of life, if there was one, must lie even lower yet. Some of the animals dredged up from these depths, again, were extremely archaic and resembled extinct fossil forms.

The results of the *Lightning* and *Porcupine* once more aroused enormous interest both popular and scientific. It was believed by some that the study of the great deeps might

give a clue to the problem of the origin of life. Accordingly Thomson and Carpenter were able to persuade the Council of the Royal Society to approach the Government and suggest that a great deep-sea expedition, purely scientific in character, might be equipped and sent out to explore the oceans and make their secrets known. Thus there came about the first great oceanographic expedition, the first great exploring voyage which had the depths of the sea as its goal and primary objective.

H.M.S. *Challenger* was a corvette of a little over 2000 (2346) tons with auxiliary engines. She sailed in December 1872 with Professor Wyville Thomson in charge. John Murray, later to become a famous oceanographer and head of the organization, was one of the scientists on board. The *Challenger* returned in May 1876 after a voyage of 69,000 miles in the Atlantic, Pacific and Indian Oceans during which she penetrated as far south as the Antarctic pack ice and carried out dredgings, trawlings and soundings at 362 observing stations.

The voyage of the *Challenger* was something quite new and may be said to have laid the



"Challenger Report"

H.M.S. Challenger off Kerguelen Island, in squally weather on February 1, 1874. This uninhabited island in the Southern Ocean has a peculiar indigenous cabbage, the Kerguelen Land Cabbage. When the Erebus and Terror visited the island it was an important item in the diet of their crews

"Challenger Report"

Trawling, dredging and sounding arrangements on board H.M.S. Challenger. All lines in those days were of rope and not of steel as they are today. They ran over blocks attached to "accumulators" designed to take up the strain due to the rolling of the ship. These were slung from the yard-arms and consisted of stout india-rubber bands stretched between discs of wood. Nowadays strong accumulating springs take up the strain on the steel lines



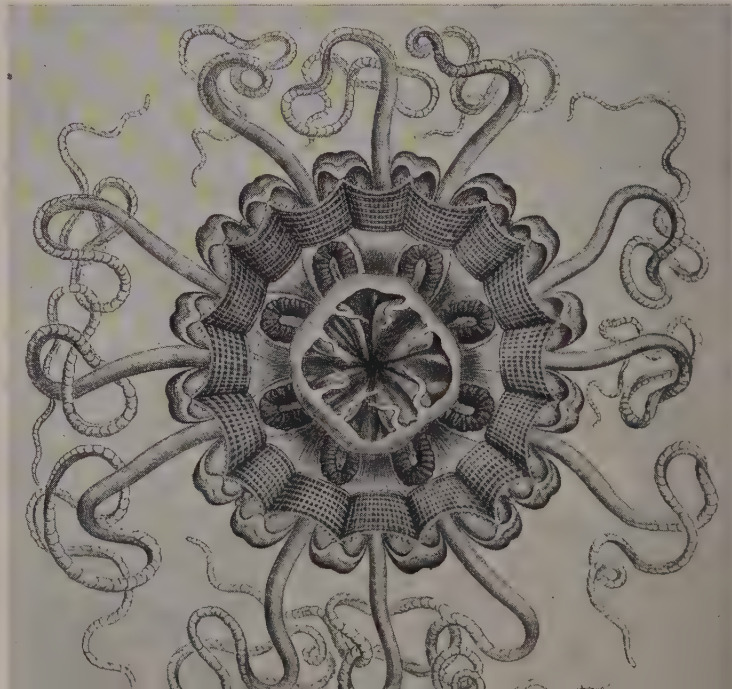


Sailors emptying a dredge on board H.M.S. Challenger. The dredge was of essentially the same type as that used in oceanographical research today. It consisted of a bag of stout netting attached to a rectangular iron frame. Behind the bag was a bar which trailed tassels of rope so as to entangle small animals which might evade the bag

Challenger Reports"

"Challenger Reports"

Periphylla mirabilis, Haeckel. A beautiful crimson jelly-fish taken by the Challenger. It is widespread all over the Atlantic Ocean and is found at the surface in cold seas, but sinks down into cooler water at greater depths in the tropics. The Challenger Expedition was the first to use nets for collecting plankton systematically in the open ocean



foundations of modern oceanography. The science of the sea became fully fledged from that time. To realize what a great achievement this voyage was one must remember that there were no steel wires for trawling or for dredging in those days. Ropes were used for all operations, even for the deepest soundings, and it was a common and heart-breaking experience for the *Challenger* scientists to spend all day patiently hauling a dredge in deep water, only to lose the whole catch under their very eyes, the towing rope parting just at the moment of added strain when the laden bag left the water.

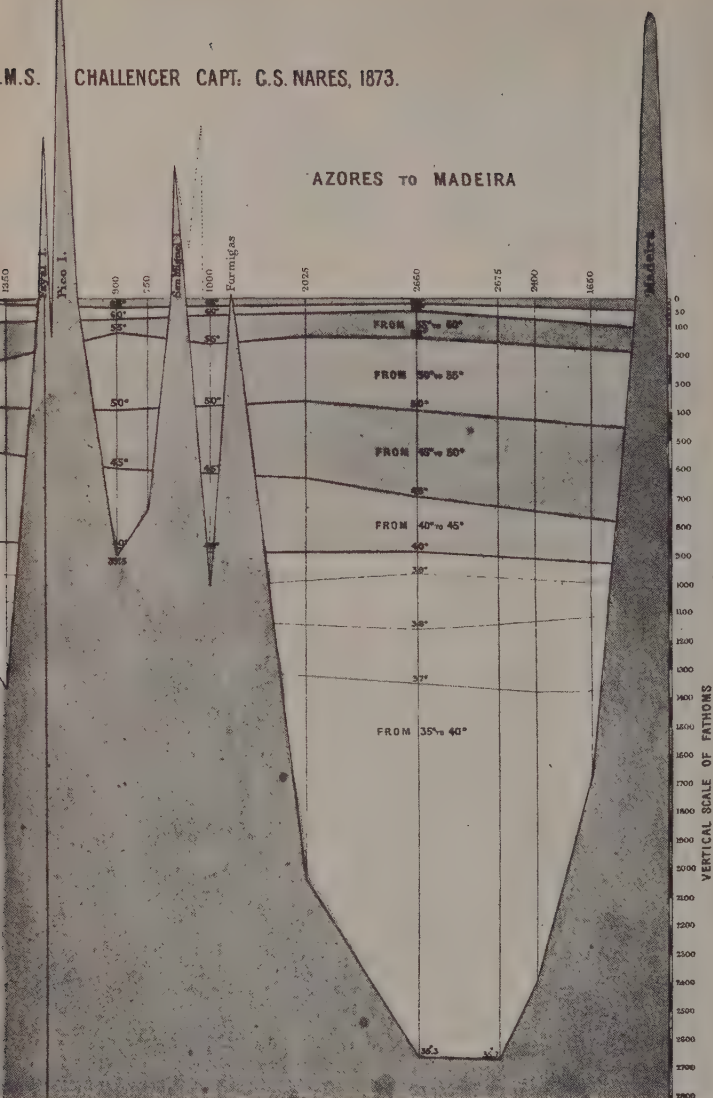
Sir Wyville Thomson's health broke down soon after his return to England and he died in 1882. The publication of the results of the *Challenger Expedition* was left to Dr (later Sir) John Murray. Fifty magnificently produced volumes of the *Challenger Reports* today contain the results of that classic voyage. The soundings and bottom samples brought back by the expedition were sufficient for the production, for the first time, of contour charts of the floor of the ocean and maps of the bottom deposits. The zoological collections, as might be expected, contained an immense amount of material that was new to science so that the *Challenger Reports* became the foundation upon which the study of marine life is built. But the hopes of those who believed that many ancient and archaic forms, belonging to extinct groups, would be found in the depths of the ocean were disappointed. There was, and is, no evidence of an ancestral population in the deeps and, since these have been populated from the shore, this is perhaps not surprising. Nevertheless the *Challenger* found that life existed at all depths and there was no limit below which it ceased.

Sir John Murray was killed in a street accident in 1914. He was a very great man and that rare combination, a fine scientist and an astute business man. For it was while collecting deep-sea deposits from all over the world in order to compare them with the *Challenger* material that Murray noticed that a piece of rock from Christmas Island consisted of phosphate deposit—bird lime. He floated a company which obtained a concession from the Government to work on the island and, as a result of this shrewd speculation, Murray was able to show, some years before the war of 1914-18, that Christmas Island had already more than paid for the *Challenger Expedition* in royalties and taxes. After the *Challenger* returned he conducted two more expeditions, in the *Knight Errant* and the *Triton*, to the "Wyville Thomson Ridge", which forms an underwater bridge between the Shetlands and the Faeroes.



Lophius naresii—a deep-water angler fish taken by the *Challenger* in the Pacific. The long processes and filaments carry luminous organs, probably to lure small creatures through the submarine gloom towards the fish's cavernous mouth

"Challenger Reports"



Challenger Reports

Isothermal lines, drawn from temperature readings, and profile of the bottom, constructed from soundings taken by H.M.S. Challenger between the Azores and Madeira in 1873. In diagrams of this sort the vertical scale is of course enormously exaggerated

In America also, in the middle of the 19th century, the study of the sea began to arouse interest. Captain M. F. Maury was mainly responsible for the International Conference at Brussels in the 'fifties at which were laid the foundations of the modern system of meteorological reporting by ships. But it was Louis and Alexander Agassiz, father and son, who were chiefly responsible for the awakening of American interest in oceanography.

Louis Agassiz made a number of cruises

for collecting and taking oceanographical observations, with the assistance of the U.S. Coastal Survey, mostly in the ship *Bibb*. He visited the coast of Florida, the Tortugas and the West Indies, and it was in order to house the splendid collections he brought back from these cruises that the University of Harvard built the great Museum of Comparative Zoology, better known as the Agassiz Museum. His son, Alexander, also made a large number of cruises from 1877 until the beginning of the new century in the U.S. Coastal Survey vessels *Blake* and *Albatross*. He visited the Caribbean, the South Seas and the Pacific. He explored the Great Barrier Reef, the Maldives, the Bahamas and Bermuda. He made many technical improvements in deep-sea collecting equipment, introduced steel towing wires for the first time and improved the apparatus, known as "accumulators", which equalize the strain on the wires due to the rolling of the ship. He also brought into use tow nets that could be opened and closed at a fixed depth and could therefore be fished through a layer of water determined beforehand, for until then all nets had been towed open to the surface. And the Agassiz trawl, which he invented, is so designed that it will work equally well whichever way it lands on the bottom.

Thus oceanography came into its own as a science. It became universal in its interest and in its appeal, and many other nations besides Great Britain and America sent out oceanographical expeditions at about this time; the German vessel *Gazelle*, which carried out researches in

the Indian and Pacific Oceans, was second only to the *Challenger* in the range and scope of her work. At this time the American survey vessel *Tuscarora* sounded over some of the deepest water in the world off the coast of Japan.

Yet these great voyages were mainly charting and collecting expeditions. The systematic study of the sea as an environment for a rich and varied living population grew slowly upon the foundations which they laid down.

The Lötschental

by F. S. SMYTHE

In our March number Mr Seligman showed how Swiss scientists are acquiring the knowledge necessary to arm their countrymen against the snow avalanche. The following article, which is in part condensed from Mr Smythe's forthcoming book Again—Switzerland, gives some examples of the effect of this menace on a remote Swiss valley, as well as an inspiring picture of its sequestered life

ON February 15, 1946, I alighted from the Bern to Brig *Schnellzug* at the little hamlet of Goppenstein which is situated at the southernmost end of the Lötschberg tunnel.

I was on holiday in Switzerland, my first in that country for many years. So far I had stayed at Adelboden, a delightful ski-ing centre but, like all well-known winter-sports places, sophisticated. Now, by way of contrast, I was anxious to visit one of the remoter and less sophisticated Swiss valleys.

My choice had fallen on the Lötschental. I had seen that valley once before when with a friend I had passed through a portion of it *en route* to the Bietschhorn hut from which we had successfully traversed the Bietschhorn (12,970 ft.). We had walked from Goppenstein to Kippel up the valley before turning aside towards the hut on as perfect a summer afternoon as may be imagined, and ever in my memory had remained a picture of centuries-old wooden villages set amidst flowery meadows and dark sweeps of forest with, far beyond, the shining parabola of the Lötschenlücke (10,512 ft.), the pass linking the valley with the central snowfields and glaciers of the Oberland *massif*. Here, I remember thinking, was one of the loveliest of all Alpine valleys, unspoiled by commercial development, and rich in historical associations, a valley in which people live as their ancestors lived, quietly and at peace. Here, if anywhere, was to be found the perfect contrast with the years of war.

The Lötschental at Goppenstein is so narrow as to form almost a gorge, and it continues in this manner towards the Rhône valley which it joins at Gampel. Goppenstein itself is one of the dreariest spots in all Switzerland, and its sole importance consists in its situation at the end of the great Lötschberg tunnel, in which gangs of men are constantly at work on maintenance, and as a supply link with the Lötschental.

On arrival at Goppenstein I in-

quired of the station-master whether my luggage could be conveyed to Kippel on the post sledge.

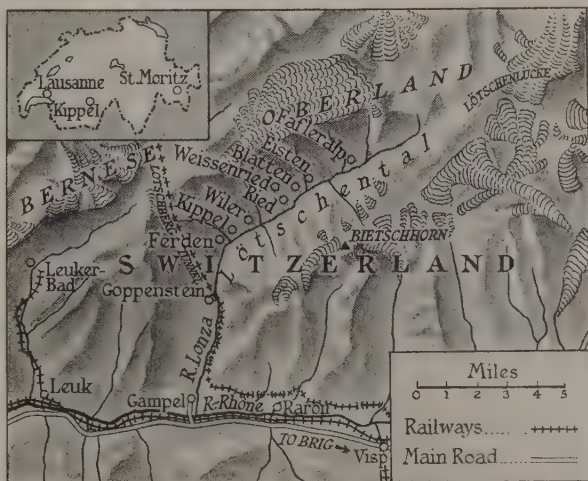
"There is no post today," he replied. "Look, the avalanches!"

I looked, following his outstretched arm. Two huge avalanches had fallen across the valley within two hundred yards of the station.

"Six men were caught," he continued, "but they escaped with their lives. Two were buried for three hours but we dug them out. . . . One moment, though, there is a man here who has a sledge waiting the other side of the avalanches. He will take your luggage to Kippel."

To reach the sledge I had to clamber over the debris of the avalanches, both of which were fully 50 ft. deep. Already a gang of men was at work driving a tunnel for the road. This locality is notorious for avalanches, and in 1908, during the construction of the Lötschberg tunnel, one fell onto a hostel which had been erected for the engineers, killing twelve and injuring fifteen persons.

The sledge was a rude affair drawn by a single horse. On it my suitcase, ruck-sack and ski were placed, and we set off up the valley track.





11 Kodachromes and photographs, except one, from the author

Kippel from the north. Its wooden houses are clustered together in a spot well protected from snow avalanches

The main street of Wiler. The houses are arranged endwise towards the street. This is in order that snow sliding off their roofs will fall between them, not on the heads of passers-by. Such falls of snow may be several feet thick and constitute a real danger unless houses are properly arranged



It was a remarkable little procession. Seated on a pile of sacks in the front of the sledge was an old lady. She was beautifully dressed. A white silk scarf was wound round her head, and another and larger black silk scarf edged with lace was wrapped about her shoulders over a high-corseted flowing black silk dress. But it was not her attire, tasteful, simple and beautiful though it was, that drew the attention, but her carriage and above all her face. She sat bolt upright, as straight and stiff as our Victorian grandmothers, her hands clasped over her lap. Her hair beneath the white silk scarf was also white, a white so pure

that in the deeply shadowed valley it seemed to catch and hold the reflected sunlight from the snows above, so that her face was framed in an aureole of silvery light. And what a face! It was old, very old, pale and transparent with age; yet it was the face of a Madonna, a perfect oval out of which two dark eyes gazed steadfastly ahead. If it was wrinkled then I do not remember the wrinkles; I remember only something to which it was impossible to apply a span of years, something pure and infinitely serene.

For the rest there was a peasant who led the horse by the bridle, and a youth and a girl



The village of Wiler is built on the same pattern as most Swiss villages. The larger houses crowd round the church, and on the outskirts are the smaller. The crucifix stands by the path leading into the village

who trudged along behind.

I could only surmise that the old lady had been to a wedding or a funeral, perhaps to bury one of her children or grandchildren. It would have been impolite to inquire, and I doubted whether my German was equal to the patois of the sledge-driver and his companions.

At the village of Ferden the valley bends almost at right angles, opening out as it does so into broad meadows, wooded mountain-sides and spacious alp-lands. Eight miles distant it ends in the long, gently-sloping Lötchen glacier which leads in its turn to the Lötchenlücke, as beautiful and as obvious a pass as any in the Alps. The declining sun was still pouring its rays into the valley, and the snowy scene was in striking contrast with the dark sunless rift through which we had passed from Goppenstein.

A mile ahead was Kippel, the tall thin spire of its church soaring above a huddle of snow-mantled huts and chalets. Southwards of the village the eye passes over pine forests to the open alps above and thence climbs crag,

moraine and glacier to the majestic pile of the Bietschhorn, mountain *doyen* of the Lötchenthal. It was first climbed in 1859 by Sir Leslie Stephen with four Lötchenthal natives who "appeared in full dress-coats and 'chimney-pot' hats, or such imitations of these civilized articles of torture as pass current in the Lötchenthal".

The spirit of the past was very much alive that evening as, in the last glow of the sun, our own singular little party jogged along the track to Kippel. The prospect had changed but little in the past century, and I should hardly have been surprised had someone come forth to question me as to the progress of the Crimean war or the first ministry of Mr Gladstone. As for tail-coats and 'chimney-pot' hats, they would be natural concomitants of the old lady on the sledge.

I stayed at a small hotel-pension at Kippel. As the sole visitor to the valley, and an Englishman at that, my advent occasioned a considerable stir. At first I was told there was no food, or rather no tourist food. My worthy host, a burly ex-guide, and his wife



Blatten is the highest village in the Lötchenthal to be populated in winter. It is also one of the oldest and most beautiful of the Lötchenthal villages, being arranged above the stream that has its source in the Lötchen glacier at the head of the valley. Beyond lie the great snowfields

were vastly concerned to make me comfortable. Would I mind eating the local food? Could I possibly cope with rye bread? I could and did, and thrived. Such food as I ate was infinitely to be preferred to the tinned food so lavishly provided at some of the popular winter-sports places. The people of the Lötschental live on what they produce: rye bread, cheese, butter, eggs, vegetables, fruit, etc. Only such commodities as salt and sugar are imported, and tins seldom find their way into the valley. What is the result? According to an American dietetic expert who visited the valley in the course of a world tour, the health of the people is outstanding. Good teeth are a feature of both young and old, while tuberculosis is practically unknown among the 2000 inhabitants of the valley; indeed, I was given to understand that there had not been a fatal case. The statistical figures for health are in striking contrast with those in other valleys to which the tourist industry has brought 'civilization'—and tins.

In spite of its remoteness and difficulty of access there is evidence that the Lötschental was inhabited from early times. A sword was excavated dating back, it is estimated, to

350 B.C. and bronze objects have been found, suggesting that hunters lived in the valley far earlier than this. There is also evidence to show that Roman culture penetrated to the valley.

Throughout the Middle Ages and the evolution of the Swiss Confederation the valley, although remote, had its share of strife and trouble. Thus, during the civil war that devastated the Valais from 1362 to 1366, a contemporary document mentions that 1012 houses were burned, and many persons killed in the valley. In general, the history of the Lötschental reflects that of Switzerland as a whole and the Valais in particular, a struggle to achieve and then maintain freedom which lasted until the country had been freed from the tyrant, Napoleon.

Yet the greatest struggle of all has always been against nature, against avalanche, snow-fall and flood. As with other Alpine valleys, careful husbandry, the wresting of alp and meadow from the barren hillsides, and the utilization of every cultivable inch are the only means of solving the problem of existence. What a lesson these simple peasants have for us with our wasted acres and our incessant demand for food from overseas!

In religion the valley is Catholic. This faith is strong among the people, especially in their reverence for God as revealed in a fruitful and beautiful Nature. In the simple, happy and serene manner in which they live—and crime does not happen in the Lötschental—they are inspired and assisted by their Prior the Reverend Siegen of Kippel. I had the privilege of meeting this remarkable cleric who is known far outside the confines of the valley not only for his religious work, but as the author of an excellent work on the valley, its history, traditions and customs.

When in the course of conversation I remarked how greatly the people impressed me with their old-world courtliness, their happiness and perhaps most of all their serenity, he replied: "I try to teach them to see God in the beauty and magnificence of their surroundings; and when they eat of the food they grow on the slopes of these mountains I say to them, do not merely eat it but think, when you eat it, of God's sunlight and His grace that went to the making of it; then it will make you well and strong and bring you happiness. And this, I think, is why my people are so healthy."

He told me also with unaffected sincerity that when the alps are open in the spring he first of all blesses them so that the herds and flocks that live on them during the summer shall be "fruitful and multiply exceedingly".

He is a strong mountaineer and accom-



Herr Siegen, Prior of Kippel, has devoted his life to the welfare of the Lötschental people



A corner of Blatten. The rich brown weatherworn timbers of the old houses in the Lötschental are an agreeable contrast with the glaring snow. Note the elaborately carved woodwork in the balconies of the chalet. The Swiss are very fond of employing their woodcarving skill in exterior decoration

panied some of the more active of his parishioners to the summit of the Bietschhorn where he conducted mass. As he said: "I did not do it as a mere feat, but because it lies within my parish and all ground within my parish is sacred to me. This is the highest mountain and on high mountains men may see God."

Anyone who has met Prior Siegen cannot fail to be impressed with his earnestness and learning. His is a great and kindly personality, and he preaches a simple, but no less great, philosophy to a simple people.

In his book *Inscriptions from Swiss Chalets* the late Mr Walter Larden gives an interesting account of house inscriptions in the Lötschental. In many, but not all, parts of Switzerland houses have inscriptions carved on the outside, but in the Lötschental it is mostly the insides that are rich in inscription and elaborate carving.

A large proportion of these inscriptions have a religious significance, more so than in Protestant Switzerland. They go back to the 17th century at Kippel, and there is one at Ferden dated 1591. The following

translations are examples:

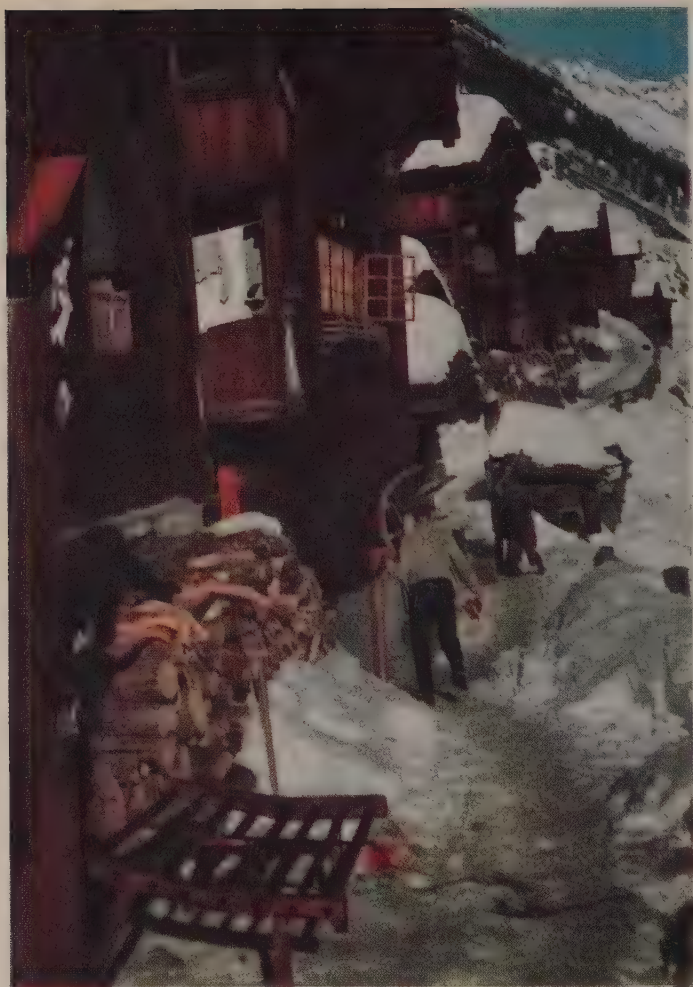
Hear, O my house-folk, what I say unto you; and bear the same in your hearts. Love God above all things; so can nothing miscarry with you. (Dated 1620.)

He who builds a house must soon quit it, unless he build one that will last for ever. See that thou preparest for thyself a house in eternity. (Dated 1698.)

One very noticeable feature of the Lötschental is the compactness of the villages. In the Bernese Oberland houses are scattered far and wide over the hillsides but in the Lötschental they are clustered tightly together. This is because few areas in the valley are safe from avalanches; also the winter snow-fall is so great that the inhabitants might otherwise be unable to attend church.

Electric light is now available, but even so many of these old houses are ill-lit, and the visitor may have to grope his way up the curious spiral interior staircases which are a feature of the valley.

I spent some days also in wandering about and taking photographs. Between Kippel and the Lötschen glacier are the villages of



The butcher of Blatten starts off on his round. He has just cut up the meat on the stand in the foreground and he is now delivering the cuts to the neighbouring houses. The scene with the crucifix, the store of wood, the sledges and the ancient houses is typical of Alpine Switzerland

Wiler, Ried, Weissenried, Blatten and Eisten, and higher still several enchanting alps including the Fafferalp where there is an hotel well known to summer mountaineers. Perhaps the quaintest, and I should imagine in summer the smelliest, of all the Lötschental villages is Blatten. When I visited it one perfect sunny day between snow-storms that had piled the snow several feet deep, it was to see the village butcher at work cutting up a carcase on a stand in the open and then distributing the meat by hand to the neighbouring houses.

No one with any imagination can remain in the Lötschental without wanting to visit the Lötschenlücke, and cross its snowy curve onto the great snowfields beyond; and an

improvement in the weather tempted me to hire a guide and ascend to the Hollandia hut which stands on the pass. The guide was a young fellow, Willy Lehner by name, the champion ski-er of the valley and as strong as a horse.

It is a long way from Kippel to the Lötschenlücke, at all events for a first day's high mountaineering of a Swiss holiday, and it is necessary to climb over 6000 ft. in a distance of eight miles. To assist in carrying our five days' provisions I hired a porter, a tall man who sported somewhat incongruously a pair of voluminous and vivid 'plus-fours'.

The weather was doubtful and a bitterly cold wind was blowing on the Lötschen glacier. Seven hours after leaving Kippel we



At Kippel a peasant woman scours out a milk container at the village water-trough. These troughs, which seldom freeze as the water is conducted deeply underground, are much in use summer and winter for washing clothes and household utensils. The wood store is evidence of masculine industry

During the winter the men of the village spend much of their time in sawing and splitting logs. They never seem to tire of this exercise. It is responsible for the exceptionally strong arm muscles developed by the Alpine guide, which enable him to cut steps for hours on end without undue fatigue





Klopfenstein, by courtesy of Swiss Tourist Bureau

The Lötschenlücke. This beautiful snow pass leads from the Lötschental onto the central glaciers and snowfields of the Bernese Oberland. The pass is 6000 feet above Kippel and is reached in about eight hours after a long and gentle climb very suitable for ski-ing in winter and spring

arrived at the hut. The porter returned to Kippel and Lehner and I settled down to make ourselves as comfortable as possible. The cold was now intense: the highest temperature we were able to raise in the hut (and this after intensive cooking operations over the stove) was no more than minus 5° centigrade.

That evening we witnessed one of the most lurid and ominous sunsets I have ever seen. This, as it proved, was the prelude to a series of snowstorms and blizzards that were to last for nearly one month during which precipitations up to three metres of snow occurred in some places, more than the oldest inhabitants could remember experiencing in March.

Clouds lay over the Lötschental far below, and above them Mont Blanc showed hard and clear 110 kilometres distant. Then quickly a higher layer of cloud spread up from the south and as I watched I saw what appeared to be a vortex or whirlwind taking place amidst the mists gathering over the Bietschhorn.

The colourings as the sun set were in brilliance and contrast almost beyond belief. I have seen such brilliant sunsets a few times before and taken in conjunction with strata of cloud at different levels they have invari-

ably preceded bad weather. And so it proved on this occasion. The storm broke in the night, and we rose next morning to find a blizzard blowing. Furthermore, the barometer had fallen over half an inch in the night. In these circumstances I gave the order for immediate retreat to Kippel.

A hurricane was raging across the Lötschenlücke, and not far from the hut I was blown off my feet and made an impromptu descent of the snow-slopes for about three hundred feet.

The snowstorm continued for the following two days after our return to Kippel, and the snow piled up to such a depth that when I decided to leave the valley I found that the post was not functioning and that the valley was cut off from Goppenstein. As I could find no one to carry my luggage owing to the possibility of avalanches, I carried it myself, ski-ing down to Goppenstein with my suitcase on my back and then returning for my ruck-sack.

It has been possible here to give no more than a brief account of one of the most delightful valleys in Switzerland. It is an outstanding example of a valley relatively remote from outside influences, the people of which live healthily, simply and contentedly.

Alpine Flowers

Notes by H. R. FLETCHER

Photographs by H. HINZ

Every traveller in the Alps marvels at the abundance of flowers produced even on the smallest plants. So densely crowded are they, such large bright patches of colour do they form, that alpine flowers seem larger than their allies at lower altitudes. Actually this is not the case, although they are certainly more brilliantly coloured. The higher we climb, the deeper blue become the gentians and forget-me-nots; the pale yellow of the primroses gives place to the richer shades of pink and violet of other primulas. That this is due partly to alpine conditions is shown by the fact that the colour of many alpine flowers fades when they are brought into cultivation. Compared with their lowland kin they are often more strongly scented, produce more honey and are better suited for self-pollination



Crocus albiflorus is a form of the Spring Crocus (C. vernus), ranging widely in Central Europe from the Pyrenees to the Carpathians. With Blue Moon-wort (Soldanella alpina) it is the first spring flower to appear, sheeting many an alpine height in France, Switzerland, Italy and the Tyrol with myriads of white blossoms, side by side with the last drifted patches of snow



Paradisia liliastrum, the *Alpine Lily* or *Great Saint Bruno's Lily*, is mainly distributed in the alpine pastures of the Alps, and spreads only towards the Pyrenees and the Apennines. It is a superb replica of the *Madonna Lily* (*L. candidum*), with the purest of white flowers, and may grow in such profusion as to form great snow-like drifts, as on the northern slopes of the Mont Cenis

(Below) *Gentiana lutea*, with spires 3-4 feet high of citron-yellow flowers, is the giant of the race of *Gentian*, inhabiting meadows and pastures over the entire Alpine chain, occasionally forming great golden sheets. In many places, however, it has become rare through being uprooted, for the root furnishes the well-known *Gentian-root* of commerce



Lilium Martagon or *Turk's Cap Lily* is found in limestone pastures and underwoods over an area extending from Spain, through the alpine regions of Central and Southern Europe, the Caucasus and onwards into Asia. Throughout its wide range the flower colour varies from purple to vinous-red or near-black, or even to white. One either likes or dislikes its strong evening scent of vanilla and cinnamon



(Below) *Rhododendron ferrugineum* or *Alpine Rose* is a spreading, leggy, evergreen shrub, seldom over 18 inches tall, with Box-like leaves rusty-brown on the under surface, and clusters of deep pink flowers. It haunts the Alps of Southern Europe from the Pyrenees to the Austrian Alps, often hybridizing with an ally, *R. hirsutum*, also called *Alpine Rose*



Soldanella alpina, an exquisite denizen of alpine limestone pastures, frequently tinting the margin of melting snow with a film of pinkish-violet. Ruskin has described it as it emerges through a small opening in the snow as "a slender, pensive, fragile flower whose small purple and fringed bell hangs down and shudders over the icy cleft that it has cloven"



Gentiana verna, the Spring Gentian, is widely distributed, being found in Great Britain, the marshy meadows and pastures of the alpine chains of Europe, and even in parts of Asia. These starry flowers of infinite shades of blue, pink or even white, together with such treasures as violas and forget-me-nots, form glorious carpets of colour from April to June or July

Prospect for the French Child

by ROBERT SPEAIGHT

NOT long ago I began telling my small son, aged eleven, stories about the French Resistance. At last, however, these became exhausted and I was driven to buy the three volumes of Rémy's *Memoirs* in order to maintain my *répertoire*. Sometimes it meant translating a chapter as one went along, and sometimes my son's small playmates would be called in to listen. It is a very persisting image of the Christmas holidays—the five or six young faces round the fire, rapt by the epic of the French Resistance.

One thing leads on to another, and there followed demands to be allowed to go to France—demands which were scarcely cooled at all by the stern conditions attached to their acceptance; viz. solitary confinement in a French family who knew no word of English. In this way international curiosities are kindled, and I find myself wondering what kind of answering spirit my son will find among his French contemporaries, if he really begins, this year or next, to play upon the sands at Arcachon. Will the separate experiences of the same war, which must often have seemed to the French like two wars and which yet may sometimes have given them the illusion of peace—will these contrasting memories be an obstacle or a stimulus to understanding?

I think I know the house where he will stay. It lies back among the pines at Arcachon, not two hundred metres from the sea. The interior is a little dilapidated and the garden unkempt—the result of German occupation. But there is plenty of elbow-room for the families which inhabit the house in summer. To begin with, there is a grandmother (widowed) and a great-aunt—sisters and both in early middle-age; there is a sister-in-law, also widowed and also a grandmother; there are eight children, four on each side, and of these eight four are already married and beginning to have families of their own. In summer, at the week-end, there are rarely less than sixteen people in the house; some of them may be friends, staying for a few days or a few weeks. Nor is this at all an unusual picture for the *milieu*—the Catholic bourgeoisie—to which this family belongs. If you come down to Bordeaux from Paris, with its intellectual excitement and political instability, and its liveliness which is not quite the same thing as life, you feel yourself face to face with a different, a deeper, and a more

enduring France. You begin to take root in values which have survived the dynasties and the Revolutions. You have come from the arena to the *foyer*—and no one can understand the resilience of the French, unless he realizes that in France the family is still the primary unit of society.

This is not in its original impulse a religious or a political matter. It is quite true that the family is no longer as impregnable as it was. Divorce has increased in recent years and the birth-rate has disastrously declined—one remembers General de Gaulle's grim warning that France can only be saved by more babies. There are many reasons for this—scepticism, hedonism, avarice—into which I have not the space to enter. But it does remain true that, as a general rule, the Frenchman enters into marriage with a sense of social responsibility. Individualist as he is, he believes that the individual is more secure and, in the deepest sense, more free in a society where marriage is respected than in a society, like the American, which has been atomized and eroded by divorce. To protect the institution of marriage, he is prepared to tolerate a good deal of hypocrisy—but the French believe that conventions of bad behaviour and conventions of good behaviour are equally worth the price one is asked to pay for them. You may dispute this belief; you may say that the primary ends of marriage too easily get forgotten; that marriage has been infected by materialism, and that what is left is not worth preserving. But the point I want to make here is that the average French child is born into a social grouping which is still protected by society.

Where this family sense is vigorous, the parent will tend to regard riches in terms of human life; the soil of France will become inseparable from the souls of Frenchmen. During the early months of the war I was in close contact with a young French philosopher on the faculty of a mid-western American University. He was married with six children. We spent many anxious hours together in 1940 and I remember asking him once whether he didn't long to return to his native country. He replied that he was not greatly affected by physical separation from France. "Wherever my children are," he said to me, "there, for me, is France." This sentence recurred to me last summer when I

was staying with Paul Claudel in his beautiful château in Isère; the great poet and *solitaire* was happily surrounded by fourteen grandchildren. This sense of family is of course encouraged by religious belief, and it can be encouraged to the point of deformation by the passion for property. But the stability of the *foyer* is emphasized as strongly in the exhortations of the Communists as it is in the exhortations of the Catholics. For the recent elections in France the Communists had designed an extremely effective poster, showing happy and healthy children against the background of an attractive home. This concrete presentation of an ideal was in marked contrast to the poster exhibited by the P.R.L.—the party of the extreme Right. Here we saw an allegorical lady, with her hands fettered, asking to be set free. If I had been a bewildered Frenchman, wanting above everything certain practical reforms and reassurances, I should have been tempted by a comparison of these two posters to vote Communist rather than Conservative. The Communists are often reproached for their doctrinal rigidity; but here it seemed to me that the Communists were the practical politicians and the Conservatives the dreamy doctrinaires.

It is not easy even for the child to escape political classification in France; in so far as politics reflect ideas, as they so largely do, the ideologues contend for his soul. The Catholics, who compose the main strength of the Mouvement Républicain Populaire, have their own confessional organizations. Sometimes, as with the Scouts who are everywhere taken rather seriously on the Continent, they have their own compartments in a general grouping. For the youth there are the Jeunesse Ouvrière Chrétienne, the Jeunesse Agricole Chrétienne and the Jeunesse Étudiante Chrétienne. Thus the boy or girl is sustained up to the age of twenty-five by the fellowship of those sharing his social *milieu* and his spiritual environment. The Communists, for their part, have been enlarging their own Young Communist Movement to include all those who belong to the 'lay' as opposed to the religious tradition in France. It is thus hoped to rally in one formation the ideological posterity both of Voltaire and of Karl Marx. There is nothing openly anti-religious in the propaganda of these Young Republicans, and they preach more or less the same social virtues as the Catholics. The Communists are obviously eager to persuade the country that the patriotism which they so magnificently displayed in the Resistance was something more than opportunism. In peace, as in war, they want to be regarded as the custodians of a Revolutionary tradition; they

claim that in 1789, as in 1940, it was the Revolutionaries who defended the integrity of France against those Frenchmen who were prepared to sell their country to the foreigner. There is very little in what they say to contradict this; only, perhaps, one might remark that M. Thorez, the Communist leader and Vice-Premier, recommends his young listeners to give to Stalin something of the same supranational loyalty which the young Catholic gives to the Pope.

Nevertheless, you may object, surely the Communists had no monopoly of the Resistance? If Communists and Catholics could combine under General de Gaulle, why cannot they combine today? What is the point of weakening the unity of the country by solidifying the separation of its spiritual families? The answer is that every Frenchman must have a doctrinal basis for his action, and that the divisions of the French, which Julius Caesar was the first to note, correspond to radically opposed conceptions of human destiny. This explains the problem of the schools. The Vichy Government tried, with some success, to buy Catholic support by subsidizing the religious schools. These subsidies have now been withdrawn, but the Catholics persist in defending their educational independence. In some parts of France the religious schools outnumber the lay schools. A boy or girl in such a school will pay up to 6000 francs (about £12:10s.) a term, or 30,000 if he or she is a boarder. They will get more individual attention, practically no sports, but occasional acting or singing. (Outside school, however, they will find it difficult to escape the prevailing emphasis on sport, camping, and outdoor activity generally.) Girls in all schools may take domestic science as an extra subject for matriculation, but not as a substitute. They must take the Domestic Science Course, even if they are not taking the Exam. In both religious and lay schools the young people are encouraged to found a family. It has been reckoned that if the birth-rate remains at the level of 1935, when the population was 41,400,000, it will have dropped in 1985 to little over 34,000,000, with a growing preponderance of the older age-groups. In view of this, all parties are agreed upon helping the family in every possible way.

But what is actually being done? A great deal. Every child entitles the parents to a special payment at birth and regular payments thereafter until it is earning; the father of a family is helped at the expense of the bachelor and the childless married couple; mothers and families can travel on the railways at reduced rates; the family can



Jean Marie Marcel

This is a French baby. To everyone except its parents it looks like millions of other babies of European descent. But being French, it has distinctive and predetermined features. First among these is scarcity value. In 1861-68 an average of 1,004,900 babies were born in France ; in 1945, births totalled 620,000



Papillon

A French child, like most children, may be born into one of three main kinds of families : the few 'comfortably off' ; the large number with, in good times, enough but not to spare ; and the minority always in need. Perhaps one-third of French families, particularly those of tradesmen and farmers, belong to the first kind—



Papillon

—while the destitute minority comprise about a quarter. This section includes many children whose parents have no private means of obtaining the necessities of life, such as food from relatives or friends in the country. Price-controlled goods are scarce and utility clothing is mainly reserved for manual workers



French children benefit by a great deal of help external to, but supporting the family. This help is given by the State, by municipal bodies and by voluntary associations, their efforts being co-ordinated by the Assistance Publique and, for the war-stricken, the Entr'Aide Française. They control Homes in the mountains to which delicate city children are sent in the winter months—

Papillon

Papillon

—and Colonies de Vacances, some of them using classrooms in the Homes as holiday dormitories. During the summer of 1945 the Entr'Aide Française alone subsidized more than 4,000 holiday organizations which received nearly 400,000 children. These lads, holidaying on a farm, recapture the spirit of a people who "are all peasants at heart"





apillon

For children who cannot take advantage of such holiday opportunities, there are Garderies de Vacances both near Paris and near provincial cities, where the day can be passed in the fresh air with proper supervision. Another 500,000 children benefited by these, which are run by schools and private associations as well as the Assistance Publique and the Entr'Aide Française

Papillon



The emphasis on outdoor activity prevailing in France is thus evident; but French education remains primarily intellectual. The average French schoolboy has to work much harder than his English contemporary: the result is to give the brainy child a keener intellectual knife with which to open the world's oyster—and, perhaps, to cut himself . . .



Papillon

A treat : sugar on one's bread. France's home production of cereals and sugar covered in normal times almost the whole of her large consumption. In 1946 (a year of good harvest) cereals reached only 78 per cent and sugar 71 per cent of pre-war production. A tartine with margarine or real butter was still a rarity



Édouard Mouriquand

French youth did not always learn good citizenship from taking part in the Resistance, at a time when all were being brought up to believe that evasion of the Law was the purest patriotism. The Black Market is a tempting field of exercise for the qualities that taught young maquisards how to get out of a tight corner



Jean Marie Marcel

Her First Communion. Despite secularist opposition, the Roman Catholic Church remains a great social force in France. Besides exerting an influence which raises the birthrate in the more Catholic Departments well above the average for the whole country, the Church provides social contacts for young people of all kinds

largely benefit from the Assistance Publique, which receives most of the taxes on public entertainment. (Having taken an English play recently to Paris, I can vouch for bitter experience how heavy these can be.) Each *arrondissement* in a big city has its own Bureau d'Assistance. I have the strong impression, from travelling widely through France, that the mother of a family finds it easier to get domestic help than she does in Britain. A new scheme for National Insurance is due to come into being during the present year, and this again will operate for the good of the family.

I have spoken of the contemporary cult of sport. This is due, I believe, to a double reaction; a reaction against the excessive intellectualism of the French Lycée, and a reaction against the proletarian habit of life to which the Frenchman of peasant origin is very ill adapted. A Lycée may have 3000 pupils who work seven hours a day in school, and many of them will be burning the midnight oil over their home-work. There are rarely enough teachers to give them the individual attention they require, and even if they have the time to balance this mental travail with regular exercise of the body, they would find small facilities for doing so. So with the proletarian worker, who will send his children out camping for the week-end. I have sometimes asked these people what they want out of the social reforms they so energetically require. "We want a house of our own," they reply, "and if not a garden, then at least a share in an allotment where we can grow things. We are all peasants at heart."

Formidable and challenging, indeed, are the problems which confront the French youth of today. If he is now entering upon his manhood, he has spent the formative years of his adolescence under dangerous and abnormal conditions. He may have been employed in messenger work for the Resistance, and he will not have forgotten a Guy Moquet, the sixteen-year-old Lycéen who was among the hostages shot at Châteaubriant. But whether he was in the Resistance or not, he was brought up to believe that evasion of the Law was the purest patriotism and at eighteen he would very likely have escaped into the Maquis. Now he is asked to combat the Black Market and other abuses with a civic sense he has never had the chance of acquiring. His younger brother, now at the Lycée, may boast to him of a profitable traffic in cigarettes, and his parents may only be able to keep hearth and home together by buying in the very Black Market which all unite to condemn. He is face to face with the disillusion of victory and he is surrounded by false teachers who tell him that nothing

matters and that nothing is worth while. To give this bewildered generation a faith that will sustain them, and the social weapons to translate their faith into fact, is the primary task of statesmanship.

On Whit-Monday 1945 I stood in the Cathedral of Chartres with 2500 University students who had just walked forty miles on pilgrimage, some of them without shoes. I shared in their gay comradeship and learned something of their heroic ideals. I know that their like exist all over France; and I know that they will respond to any honest and intelligent call that is made upon them. This was at a moment when food and fuel were scarce, and when the French were very tired. Yet there they were, eating their breakfast on the *parvis* of Chartres after tramping seven miles on an empty stomach. Most of them probably came from the kind of families I have been trying to describe earlier in this article, and their experience and habit of the home had taught them to live in community, to correct that individualism *à outrance* which is at once a strength and a weakness of the French character. A few days later I was talking to a group of young factory workers who were spending three weeks in an educational centre near Paris. They were tied to no curriculum; they were simply free to open the windows on any cultural horizon which attracted them. They had been to Notre-Dame; they had been to *King Lear*. Being practical young men engaged in manual work, they had grasped the grandeur of Gothic architecture through an understanding of the technical problems that the Gothic architect had solved. And when it came to Shakespeare they wanted to know something about the Elizabethan stage. For many of them this was their first visit to Paris, and it had cost them three weeks' salary to come. Again, last summer, I was lecturing on T. S. Eliot's *Murder in the Cathedral* at a sanatorium high up among the French Alps. Here all the patients were students, pursuing their studies and their cures at the same time. They even publish their own literary review, and they were passionately interested in English culture—a large poster illustrating the martyrdom of St Thomas confronted me in the hall as I arrived. Or, yet again, I can still feel the enthusiasm of several hundreds of those secondary school teachers from all parts of France for whom Dame Sybil Thorndike and I gave a Shakespeare recital in Paris in 1945. I have no doubt that if one day my son finds himself in a French family, he will be met by an equal, if not a greater, curiosity; and out of curiosity will come knowledge; and out of knowledge, perhaps, love.

The New Bulgaria

by LOVETT F. EDWARDS

Now that a peace treaty has been concluded between the Allies and Bulgaria, and the Bulgarian Government has been recognized—with reservations as to the character of its popular mandate—by H.M.G. in the United Kingdom, a good moment has come for taking stock of this ex-enemy country, developments in which we are henceforth to “watch with close and friendly interest”. Mr Edwards, the Daily Telegraph correspondent in Belgrade, supplies a background for such amicable scrutiny

THE states of Eastern Europe are like soldiers on parade. Seen from a distance, one is struck by their uniforms, their weapons and the regularity of their march. As they pass the saluting base, one can see that they have individual faces. The parade over, the regiments dismissed, one finds that each has his own private character, qualities and ambitions.

Despite the incredible mixture of races in the Balkans, they have all in our minds a common uniform, the work of history. Influenced by Byzantine culture, subject for many centuries to the Turkish yoke, they have inherited a common tendency to sudden and violent upheavals and a similar trend in peasant life and art—and most of their peoples are peasant. Today they seem, from a distance, to have put on the grey garb of Soviet uniformity and their political orientation stresses the mass rather than the individual. Seen from within, they still retain the variety of type and character that one would expect from their mixture of races and languages.

Among the least known of these Balkan peoples are the Bulgarians. The unfortunate fact that their rulers brought them in on the wrong side in three major wars has lost them much of the sympathy that they deserve. In an attempt to regain the ground lost, their policy between the two great wars has been uniformly mischievous and they have been rightly regarded by their Balkan neighbours as a menace to peace, and by Europe as a whole as an unmitigated nuisance. None the less, many of their claims are just; a new spirit is abroad in the Balkans and it may be that the movement among the masses that it represents will allow more justice to Bulgaria than the squabbles of petty Balkan princelings ever allowed her in the past.

Soviet historians have tried to rewrite history, somewhat in the manner of John Richard Green, as the story of peoples rather than that of their rulers. In the case of the Bulgarians, it is a very reasonable method. For the people and their rulers, throughout

Bulgar history, have always been distinct, in policy and even in race. That has been the tragedy of the Bulgarian people and the cause of much of their unpopularity abroad.

When the original Bulgars came into the eastern part of the Balkan peninsula, they were a marauding pagan horde of Asiatic origin, little cultivated and fierce fighters. The area they conquered was already settled by Slavs, whom they made their subjects. As military organizers they were excellent and carried their offensive wars over a great part of the Balkan peninsula, being only stopped by the great walls and massive fortifications of Byzantium and Salonica. But they were few in number and were before long assimilated into their Slav subjects, and came under the strong influence of Byzantine Christianity. By the 9th century A.D. they formed a compact Slav state comprising not only a great part of Macedonia but also of modern Serbia.

Despite the brilliance of their first empire, the Bulgarians were subdued by the Byzantines and regained their independence only at the end of the 13th century. By the end of the 14th century they had lost their leadership of the Balkans to the Serbs. Then both peoples were submerged by the Turkish invasion and remained under Ottoman rule for nearly five hundred years.

This period was a hard one for the Bulgarians. Lying so close to Constantinople and the great military roads, the Bulgarians were more heavily oppressed than the Serbs, and found it even more difficult to maintain their national feeling. Even when Turkish rule became inefficient and local pashas, such as Pasvan-Oglu at Vidin, set up almost independent states, the danger to Bulgar nationality persisted through the encroachments of the Greek church, which tried to introduce Greek speech and church liturgy to the few Bulgarians who were not mere serfs, through the only powerful influence existent in the Balkans under Turkish rule—the church.

The national revival began with the publication of a Bulgarian history by a monk of



The states of Eastern Europe now mostly conform to one political pattern—that in which a single party 'front' predominates. Highly organized 'mass demonstrations' are a regular feature of such states, as seen in Sofia, the Bulgarian capital, on the occasion of (above) a political rally and (below) a harvest festival.





Girl partisans, who represent a powerful force in the New Bulgaria. Although Bulgaria joined the Axis Powers in World War II, partisan bands under Communist leadership became a thorn in the side of the government and the occupying forces, eventually forming the nucleus of the "Fatherland Front"

Mount Athos, Father Paissi, who reminded the Bulgarian people that their ancestors had been free men in their own state. The villages of the Sredna Gora, the Middle Mountains, had retained their speech and customs and the new spirit took root rapidly. Russia, also, began to take an interest in the Balkan Christians, who like her were Orthodox, and encouraged the Bulgarian revolutionary movement. Finally, Russian troops liberated Bulgaria in 1878 and a Bulgarian state was formed, first under Russian auspices and later independent.

The Bulgarians felt a great debt to Russia, which is still commemorated in the principal boulevard of Sofia, the "Tsar Liberator", and this spirit persisted, helped by community of race and the fact that the Russian and Bulgarian languages are mutually comprehensible without great difficulty. The ruling classes, however, under the Coburg dynasty looked rather to Germany, more especially after the Balkan wars when Bulgaria lost practically all the lands she had expected to gain, and was signally defeated by her former Balkan allies, Serbia and Greece. Serbian,

Greek and Bulgarian historians give almost diametrically opposed versions of what went on behind the scenes, but there is no doubt that the fortunes of war were definitely against Bulgaria. In the first World War she recovered some of her claims in alliance with Germany, but had to disgorge them again by the Treaty of Neuilly. As a vanquished nation she had little chance to get her claims regarded, though both British and American experts backed up her claim to eastern Thrace and she was promised an "economic outlet" to the Aegean which she never in fact received. Russia was then impotent, being in the throes of revolution, and Bulgaria in her disgruntledness turned to revolutionary Russia for help, as she had done in the past to the Russia of the Tsars. The powerful and well-organized Bulgarian Communist party was formed as early as 1921.

Shortly after the first World War, the great Bulgarian agrarian leader, Alexander Stamboliski, sought to interest the Serbs in the idea of a South Slav federation. But the time was not ripe. Old wounds were still too fresh and eventually Stamboliski was

murdered. The Coburg dynasty then ruled supreme, despite several insurrections, one at least led by the Communist party and some discontented Agrarians. While peasant feeling moved more and more towards the left, either following the line of Stamboliski or the scarcely more drastic tenets of the Communists, official Bulgarian policy moved towards the right and alliance with Germany. This was the time of the Macedonian bands, when the Bulgar-Yugoslav frontier was a long line of blockhouses and barbed wire, blood-thirsty forays over the frontier were of daily occurrence, and finally the Macedonians of Sofia broke out into gang warfare more bloody and vindictive than that of prohibition Chicago.

Finally in the last war Bulgaria joined the Axis powers. German troops crossed the Danube and established themselves in Bulgaria and thence conducted their lightning campaigns against Greece and Yugoslavia in 1941. Bulgarian troops took no active part in these campaigns but were afterwards used as troops of occupation in Macedonia, Thrace and parts of Serbia.

Meanwhile the rulers of Bulgaria were in no comfortable position. The people still looked towards Russia and though the Bul-

garian parliament subserviently declared war on Great Britain and the United States, they did not dare to do the same against the Soviet Union. A bitter internal struggle began. An attempt to introduce racial laws into Bulgaria failed miserably, since Bulgarian officials failed to carry out the laws and Bulgarian intellectuals protested openly against them. Sabotage, originally led by the Communist party, began early and developed rapidly. The Communists began to form bands in the mountains, where they were soon joined by considerable numbers of ordinary peasants and moderates who had got into trouble with the German-controlled authorities, by no means a hard thing to do, inasmuch as the mass of the people had little love for the Germans. Gradually these partisan bands became an effective force in the country and a considerable nuisance to the occupying troops. The Bulgarians often show one a Gestapo map showing the range and extent of their activities in December 1943. Some hundreds of bands are reported, covering almost the whole country.

Although circumstances prevented the Bulgarian partisans from ever developing an action as great as the Yugoslav, the Bulgarians claim that they had a decisive military



importance. They worked in very difficult conditions and more than once their general staff was captured and shot by the Germans. Only two of the principal leaders survived: Anton Yougov, who is now Minister of the Interior, and a woman, Cola Dragoitcheva, secretary of the Communist party, who as such wields a considerable power in modern Bulgaria.

Though very little known in the west, they none the less received assistance from the Western allies and, in return, they saved many aviators forced down over Bulgarian territory. One of the few liaison officers working with the Bulgarian partisans was Major Frank Thompson, son of Edward Thompson, the well-known poet and writer. He was captured by the government Bulgarians, maltreated and eventually shot. The railway station of the village near which he was killed has been named by the Bulgarians "Major Thompson". The men who tortured him; Lazarov and Tsontchev, were condemned to death by the People's Court at Botevgrad.

Bulgarian justice has, indeed, worked rapidly and efficiently. The mass of the pro-Germans were liquidated by the People's

Courts, even before their condemnation was demanded by the terms of the armistice. Perhaps some injustices were done; that is not unusual in times of social revolution. But there is little doubt that many, even most, of the sentences were just. It did not need a commission of control to demand the punishment of the sadists and torturers of the concentration camps. When the Americans demanded the punishment of the men guilty of robbing and torturing American prisoners of war, they were told that these men had already been shot in March 1945.

But the most important part of the work of the partisans was political. By 1942 they had formed the nucleus of a political organization, based on a combination of parties, that was later to become the Fatherland Front which is today, with certain modifications, the government in Bulgaria. Dislike of the German alliance, the crying need for internal reform and the traditional feeling for Russia combined to make this group very powerful in the country. As the Soviet armies advanced, its power grew proportionately greater, and it was eventually able to overturn the interim government that attempted to

Serbs and Bulgars have long been rivals for leadership of the Balkans, but union of all the South Slavs may end their rivalry. A sign of the better feeling needed to bring this union about is the reception in Bulgaria of Yugoslav war orphans, some of whom are here shown returning to Belgrade



withdraw Bulgaria from the war altogether under cover of neutrality. On September 9, 1944, the Fatherland Front set up a government of the left. A newly purged Bulgarian army of nearly half a million men joined the Soviet Third Army of the Ukraine and advanced through Yugoslavia into Austria, finally linking up with the British forces at Klagenfurt. Bulgaria thus became, for some months at least, a co-belligerent with the United Nations.

These men and this political combination are still in power in Bulgaria. As a former enemy state, Bulgaria is under an Allied Control Commission and was occupied by Soviet troops, until the conclusion of a peace treaty in February 1947 set a term of three months for their withdrawal. But in actual fact, while of course their presence strongly influenced political activity, Bulgaria was under the control of Bulgarian leaders, of whom the most outstanding and remarkable is Georgi Dimitrov. Though he held no official position before last year's elections, Dimitrov was the most powerful man in the country, both as unofficial leader of the Communist party and as a founder of the Fatherland Front. A romantic figure, he is best known to the outer world as the man who stood up to Hermann Goering during the ill-famed Reichstag trial. The Bulgarian government of that time refused to allow him to re-enter Bulgaria and he sought refuge in Russia where, for a considerable time, he was secretary of the Komintern. He is now Prime Minister and it may be that he will hold still higher office in the almost inevitable final union of all the South Slavs, a union which is cautiously being advocated by the leaders of Yugoslavia and Bulgaria alike.

Should this occur, the first step will undoubtedly be the union of Macedonia in a single federal unit of Tito's Yugoslavia. This union has been widely canvassed on both sides of the border, and the right of the Macedonians of Pirin (Bulgaria) to determine their own fate is one of the specific clauses in the foreign policy of the Fatherland Front



Georgi Dimitrov, the man who defied Goering at the "Reichstag trial", is now Prime Minister of Bulgaria and advocates policies that may result in federal union among the South Slavs

programme. It is probably the only solution to that most distressful problem which has kept Serbs and Bulgarians at one another's throats in modern times from 1906 onwards.

I was in Sofia for the elections of October 1946 for the Grand National Sobranie (Assembly). Though the city has been severely bombed and material is lacking for its rebuilding—as an enemy country Bulgaria did not receive assistance from UNRRA—its general aspect has not changed greatly since pre-war times. It is a neater, better laid out city than either Belgrade or Bucharest, reminding one rather of a Russian city, with its brightly coloured church domes and neatly tiled streets.

The great mountain mass of Vitosha, dominating the city and the plain on which it stands, gives Sofia a distinction and individuality which it might otherwise lack. When one rises in the morning one sees from the hotel window the mists dissolving around



Social solidarity through manual labour, at which various totalitarian governments have aimed, is promoted in different ways. Work on the 32-mile "Youth Pass of the Republic" through the mountains of central Bulgaria is described as "a voluntary offering of the reconstruction of the country"

the usually snow-capped summit. At evening, the rich colours of the sunset shift and change over the slopes of Vitosha in a panorama of unfailing beauty and interest.

It has always been a city of few rich men—today fewer still, perhaps none—and little luxury. The citizens are quiet, hard-working and usually spare of speech, save in the big political demonstrations which are a feature of all left-wing governments today. None the less, one gets the impression that neither people nor government want any remarkable innovations. They have a far-reaching programme of reform which will be put into effect without extraordinary publicity, and with a reasonable measure of consideration for individual citizens. Perhaps the reason for this is that the Communist party in Bulgaria—by far the most powerful—is a party of long standing with considerable political experience, which makes it more confident of its position and less likely to rush into extremes from which, in the long run, it would probably have to retire. It probably also accounts for their comparative tolerance—by Balkan standards—of the opposition, which still possessed its own press and rights

of assembly, though it is far from certain how long these will last. The presence of the Allied Control Commission has also been a moderating influence.

The Bulgars are a sober and industrious people. There is little night life in Sofia and what there is, is mostly patronized by foreigners. The shops also, at this moment, have little to offer the visitor. Food there is, but not in abundance. Compared with Bucharest, or even Belgrade, Sofia lives on short rations. Exception should only be made for the cheap and excellent cigarettes and, in season, first-class table grapes and excellent apples.

On the other hand, there is a considerable renaissance of Bulgarian art. Although there are at present no outstanding names, the general standard of Bulgarian painting is exceedingly high and there are some sculptors of considerable promise. Furthermore, the musical life of Sofia, though necessarily limited by a lack of resources, is very much alive. In a short stay of less than a fortnight, I was able to hear an excellent performance of Beethoven's Ninth Symphony and to see at least one performance at the Sofia Opera

which was worthy of any European opera-house, either pre- or post-war. This was the ballet *Nestinarka*, music by Marin Goleminov, founded on a strange Bulgarian folk-custom from the village of Urgari near the Black Sea. Here, on the day of Saints Constantine and Helena, the peasants go into a form of religious trance and dance, barefooted, upon live coals. It is a strange custom and has made a strange ballet, but one of haunting beauty. The décor is based on Bulgarian folk scenes and national costumes, but they have been adapted for the stage with an impressionist sense of beauty and of the theatre that saves the ballet from being the usual unsatisfactory adaptation of peasant life that one usually sees. It is a work that can, in every sense, be called mature. M. Lyubomir Pipkov, Director of the Sofia Opera, told me that he had even more ambitious works in preparation, including Ravel's *L'Heure Espagnole*, and judging from the results he has already achieved, and *Nestinarka* in particular, I believe he will be able to carry them out.

But the vast mass of the people are peasants and it is amongst them that one may look for the future of Bulgaria. The Bulgarian peasant is intelligent and inquisitive, with an intense

desire for knowledge. Furthermore, most of the intellectuals are recently of peasant stock. There is a close link between city and village and the problem of most of the Balkan states, to bring the advantages of the city to the villages, which is acute in Greece and Rumania and only to a lesser degree in Yugoslavia, scarcely exists here.

A typical sign of the new spirit in Bulgaria is the existence of bands of technical workers, teachers and professional men, who leave the city on week-ends or feast-days to help the villages. Some repair shoes, others agricultural implements, others clocks; dentists give their services to those in need, barbers, doctors and veterinary surgeons do the same. In these bands there is, perhaps, the compulsion of a social conscience. But, for the most part, the work is done enthusiastically and voluntarily.

The peasant is well aware of his own shortcomings, which are mainly technical. He is also very well aware of the problems of his own country, which are not at all what one might expect. In this land of small peasant farmers, the main problem facing the people and the government is that of land-hunger. The agrarian reform, which is an integral

Another form of activity in which "there is, perhaps, the compulsion of a social conscience", is that of bands of city workers who give help and instruction in the villages, bringing not only their skilled services but also technical knowledge which the Bulgarian peasant is eager to acquire



part of the programme of all present-day Eastern European states, is here only a palliative, as there are very few large estates for distribution. Owing to the lack of modern technical equipment, the small holdings are not sufficiently productive; for this reason the peasant remains poor. A leader of the Communist party, Vasil Kolarov, speaker of the Sobranie and one-time President of the newly-formed republic, stated that there would be no nationalization of private industries in Bulgaria, although private owners would be subject to state control. The reason was simple. As there are very few large-scale industries in private hands to nationalize, such a move would be merely doctrinaire and would not solve the problem of pressure on the land. What the government wants is to create fresh industries for Bulgaria, to occupy the surplus of peasants, and to encourage as much as possible the already flourishing cooperative movement by fostering collective peasant centres for the supply of agricultural machinery, medical equipment and consumers' needs.

Apart from technical difficulties, for which Bulgarian leaders have openly said that they will seek the aid of foreign capital, there is

no reason why Bulgaria should not create her own industry. The country has the labour, the natural resources and the intelligence. To begin with, the experience must be bought. The few large industries that she already possesses have been capably and profitably run in the past. The most important is tobacco. Bulgarian tobacco is famous throughout the world and still retains its high quality. In fact tobacco has played a part in Bulgarian politics not unlike that played by oil in neighbouring Rumania. Bulgaria is one of the few countries in Europe where one can get unlimited cigarettes of very high quality at a very low price.

Another familiar Bulgarian industry is attar of roses, distilled from the thousands of rose-planted acres in the valley of Kazanlik. True, this is mainly a luxury industry and the piercing aroma of the attar is far too penetrating for use as a perfume in its natural state. A single drop will hang about a room for days with the peculiarly cloying odour of a harem. But it has innumerable uses as a base in the cosmetic and other industries, and production will doubtless be increased. At Gabrovo, the "Manchester of Bulgaria", there is a considerable textile industry.

The musical and artistic life of Sofia is very active and has emerged in at least one noteworthy ballet, Nestinarka, in which the action is founded on a strange folk-custom of the village of Urgari near the Black Sea and the costumes are adapted from the national peasant dress of Bulgaria

All pictures, except one, from Fondatsia "Bulgarsko Dyelo"





E.N.A.

The vast rocks of Belogradchik illustrate the dramatic quality of the Bulgarian landscape, which has much to offer the lover of the picturesque; an offer which will be acceptable to many tourists when it is accompanied by such essentials as hotels, visas and reasonable currency regulations

Finally there is Bulgaria herself. The Bulgarians, perhaps rather too early in this post-war world, are making preparations for an influx of tourists. It is a competitive instinct; all the nations of Europe are on the one hand preparing for the tourist and, on the other, doing everything possible to discourage him. Everything is ready except the essentials: hotels, visas and reasonable currency regulations. It is a rare mortal today who can get as far as Bulgaria. But one cannot say that that is the fault of the country. It waits; and its attractions remain.

The Bulgarian landscape is dramatic. The vast rocks of Belogradchik are unique in Europe. One needs to go to Ajanta or Sigiriya to find their like. The valley of roses, when in bloom, is incomparable. Vidin, seen from the Danube on an early morning when the mists are rising from the river, has a fairytale beauty that one sees only in the drawings of Bilibin and the Russian *skazki*. The Black Sea, the malefic Pontus, is unique especially when seen from the ancient Greek settlements along its coast, such as Sozopol or Mesemvria, where modern excavations are

revealing the beauties and interest of the past.

Perhaps most beautiful of all is the journey along the lower Danube, where on the Bulgarian side the towns and villages are hidden behind the high banks and on the Rumanian side set far back beyond flood level, concealed by the *baltas*, wide shallow lagoons rich in fish but solitary amongst their twisted waterways of willows. There one can travel for hours as if in the dawn of the world, with no companions save infrequent fish-eagles and huge companies of black-and-white storks which rise on the approach of the steamer in slow, lumbering, ragged-winged flight.

Yes, Bulgaria is beautiful. Also it is little known. Its peasants are hospitable, and, despite all political influences, greet the Englishman or American, those rare birds of passage, and make them welcome. I have seldom met such hospitality, even in the Balkans where hospitality is a point of national honour. If I have helped in some way to make this country better known and better understood, I shall have cancelled only a portion of the debt of hospitality and welcome that I have received from the Bulgarians.

Radio Waves Around the Earth

by SIR STANLEY ANGWIN, K.B.E., D.S.O., M.C.

Representatives of the U.S.S.R., the U.S.A., the United Kingdom, France and China, meeting in Moscow last October, recommended that a world conference on radio communications be convened in May 1947. Sir Stanley Angwin, leader of the U.K. delegation at that meeting, was Engineer-in-Chief of the General Post Office until the end of 1946, when he became Chairman of Cable and Wireless

An article in the June 1946 number of *The Geographical Magazine* described the general principles and some peace-time applications of radar (radio-location) with special reference to navigation by sea and air; while an article in the August number showed the great importance to meteorologists of this new method of exploring the atmosphere; and also described how the meteorologist is able to assist the radar expert in unravelling some of the problems associated with radar performance, with particular reference to 'anomalous propagation'.

Both these articles dealt with modern uses of ultra-short radio waves; and in the following article I propose to explain the general framework of radio transmission into which these latest applications of radio have to be fitted, together with other recent developments in the use of the short and ultra-short waves, in connection with the planning of communication channels, to which a brief reference was made in the first article.

technical terms of the subject and, in particular, with the classification of frequencies and wave-lengths; as well as with the 'ionized layers' in the upper atmosphere, the investigation of which was shown, in the first article, to have been the point of departure for these new developments.

The distance over which radio waves can be used depends largely upon their frequency (or wave-length) and a classification of radio waves in terms of frequency, as adopted by various Services, is given below, together with the frequency of light for the purpose of comparison.

In order to appreciate the particular uses of radio waves at various frequencies, it is necessary to consider the different ways in which radio waves can travel from one point to another and the effect of frequency on these different modes of transmission. Now an aerial connected to a radio transmitter radiates waves at various angles relative to the ground: the waves that travel over the surface of the

Type of Wave	Frequency	Equivalent Wave-length
Very low frequencies (V.L.F.) .	10-30 Kilocycles per second	30,000-10,000 metres
Low frequencies (L.F.) .	30-300 " "	10,000-1,000 "
Medium frequencies (M.F.) .	300-3,000 " "	1,000-100 "
High frequencies (H.F.) .	3-30 Megacycles per second	100-10 "
Very high frequencies (V.H.F.) .	30-300 " "	10-1 "
Ultra-high frequencies (U.H.F.) .	300-3,000 " "	100-10 centimetres
Super-high frequencies (S.H.F.) .	3,000-30,000 " "	10-1 "
Millimetre Waves .	30,000-300,000 " "	10-1 millimetres
.....
Infra-red .	3,000,000 " "	0.1 "
Edge of visible light spectrum .	400,000,000 " "	0.00075 "

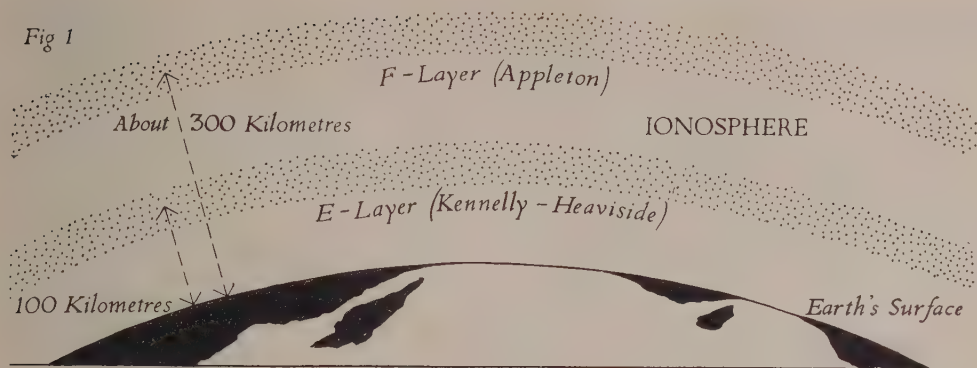
In so doing, I shall try to show some of the ways in which radio transmission is influenced by the earth and its surroundings and how far our present knowledge of these surroundings enables us to bring order into the allocation of radio waves among their many users.

It will be necessary, in the first place, to deal in somewhat greater detail with the

earth are used for what is known as 'ground wave' transmission, while the waves that travel skywards give rise to 'sky wave transmission'. Each kind of transmission has its special uses and will be discussed in a little more detail below.

Ground waves are absorbed by the earth as they travel away from the transmitter and

Fig 1



All diagrams by T. S. Jeffernan

this absorption is higher the higher the frequency, and is greater over land than over sea.

THE IONIZED LAYERS

It is obvious that sky waves, travelling upwards from the transmitting aerial, would be lost to the earth unless there were some 'agency' to reflect them downwards again. Such a reflecting agency is produced by the action of solar radiation (chiefly ultra-violet light) on the gases of the high atmosphere. Briefly, the effect of the sun's rays is to split loosely-bound electrons away from their parent molecules of the various gases, the freed electrons having negative charges of electricity and the molecules (minus one or more electrons) being left positively charged. These two components are known as negative and positive ions respectively, and the process is called 'ionization'. Although the amount of ionization varies fairly smoothly with height, there are regions where it is more pronounced. Thus, at a height of about 100 kilometres, and between 250 and 350 kilometres, there are layers of more intense ionization, the lower being known as the E-Layer or the Kennelly-Heaviside Layer—after the scientists who first suggested its existence—and the upper, the F-Layer, or Appleton Layer, named after its discoverer. The higher layer is the more intensely ionized, and the whole ionized region of the atmosphere is known as the 'ionosphere'.

Since the ionized layers are due to the action of the sun's rays, it is easily seen that the degree of ionization will vary from day to night, seasonally, and also with the phase of the 11-year sunspot cycle. The ionization of the E-Layer 'follows' the sun closely and is greatest at local noon; it fades away at night due to the recombination of electrons and molecules, while the ionization of the F-Layer, although it does not fade away altogether, decreases to about one-third of its day-time value. At sunrise the F-Layer splits into two

parts, an upper F₂-Layer at a height of about 350 kilometres and a lower F₁-Layer at about 250 kilometres. These two layers combine into a single layer again at sunset.

REFLECTION FROM THE IONOSPHERE

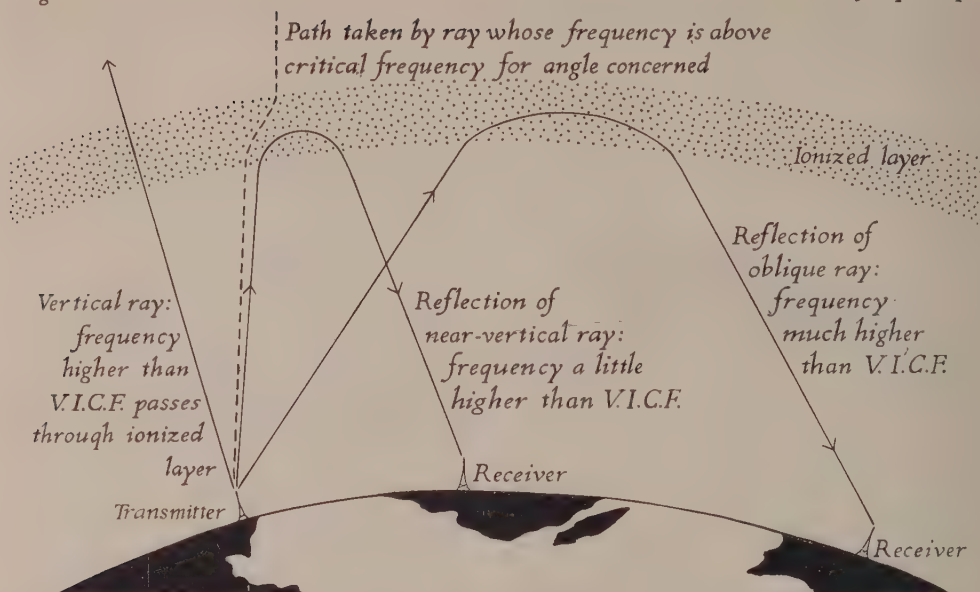
Having outlined the nature of the ionosphere, let us consider its effect on a radio wave. The electrons in the ionosphere are set in vibration by the passage of a radio wave, and the reaction between the electrons and the wave causes the latter to be reflected away from the ionized layer. In addition, the wave is weakened through energy lost by collisions between the lighter, vibrating electrons and the heavier gas molecules.

Low frequency waves are reflected by the ionosphere very much in the same manner as a mirror reflects light waves. Higher frequencies are not reflected so sharply but are 'bent' more gradually, as illustrated in fig. 2. Waves of higher frequencies require greater ionization to bend them sufficiently to return them to earth, and waves that strike an ionized layer obliquely require less ionization than vertical waves.

Thus, if a radio wave is projected vertically upwards and the wave frequency is gradually increased, a frequency will in the end be reached at which the wave ceases to be reflected back to earth, passes out through the ionosphere and is lost to earth. The frequency at which this occurs is called "The Vertical Incidence Critical Frequency" (V.I.C.F.). Higher frequencies than this, of course, can be used for oblique rays, and for the lowest angles, corresponding to the longest 'hops' of about 3500 kilometres (2000 miles), between the points of transmission and return to earth, the highest frequency that will be reflected back to earth is usually about three and a half times the V.I.C.F. Thus, for a given distance between transmitter and receiver, there is an upper limit to the frequency that can be used, the "Maximum Usable Fre-

Fig 2

V.I.C.F.=Vertical incidence critical frequency



quency" (M.U.F.), and waves of higher frequency are not bent sufficiently to return them to the receiver. The waves may be returned to earth beyond the receiver or, if the frequency is sufficiently high, they may pass right through the ionosphere and be lost to earth: in other words, for a ray at a given angle to the ground there is a critical frequency limit above which the ray will not be bent sufficiently to return it to earth. This critical frequency will be reflected at the level of maximum ionization in the layer, while lower frequencies can be reflected more sharply at lower levels of ionization. The absorption suffered by a radio wave in passing through the E-Layer, on its way to and from the more highly ionized F-Layer, is *less* the *higher* the frequency, so that the optimum frequency is the *highest* that will be reflected back to the receiver.

FACTORS OF INTERFERENCE

The art of radio communication lies in providing readable signals at the receiving points, and it is clearly necessary for the strength of the radio wave to be sufficient for the 'signal', such as speech or Morse code, to be easily distinguishable above the general level of atmospheric noise. This noise arises mainly from lightning discharges, each lightning flash acting as a powerful radio transmitter sending out radio waves over a wide range of frequencies. The transmission of these noise

waves may be considered in exactly the same way as that of more orthodox signals from a radio transmitter. Thus, for all frequencies the ionospheric absorption is greater during the day than at night, so that the level of atmospheric noise at any point is considerably greater at night than during the day. The highest frequencies are not likely to be transmitted over very great distances, particularly in an east-west direction, since the ionospheric conditions in a dark (night-time) portion of the path would not be suitable for reflecting the waves back to earth; and it is thought that the electrical noise actually generated by the lightning flash is less at the higher frequencies. Atmospheric noise from this cause is greater in certain fairly well defined thunder-storm areas of the world such as South Africa, the China Seas and the Caribbean Sea. Atmospheric noise is negligible on frequencies above about 30 Mc/s. (Megacycles per second); but occasionally, on frequencies between about 10 and 100 Mc/s., noise from the sun can cause considerable interference. An appreciable amount of noise can also be detected coming from the Milky Way and recent work has shown this to be most intense from the direction of the centre of the galaxy.

LOW FREQUENCY TRANSMISSION

We may now weigh up the relative advantages and disadvantages of ground wave and sky wave transmission in relation to the two

main classes into which, at this stage, it may be helpful to divide radio frequencies: low frequencies (less than about 2 Mc/s.) and high frequencies (between about 2 and 50 Mc/s.)—it will be more convenient to discuss later the use of frequencies higher than about 50 Mc/s. Low frequencies are used chiefly for short and moderate distances, ground wave transmission being employed. Their effective range depends upon the transmitter power available to compensate for ground absorption. Such transmission is relatively constant, there is no rapid fading such as is experienced on high frequencies, and there is no 'skip' zone (see later).

HIGH FREQUENCY TRANSMISSION

High frequencies, on the other hand, are used mainly for long-distance transmission by means of the sky wave reflected back to earth by the ionosphere. The range of the ground wave is very small because of the higher ground absorption at the higher frequencies. The reflecting and absorbing properties of the ionosphere depend upon the amount of ionization produced in the high atmosphere by solar radiation, and these properties vary, therefore, diurnally, seasonally and with latitude. Over a given path, higher frequencies can be used during the day than at night, and higher frequencies can be used in tropical regions than in higher latitudes. As mentioned above, the strongest sky waves are

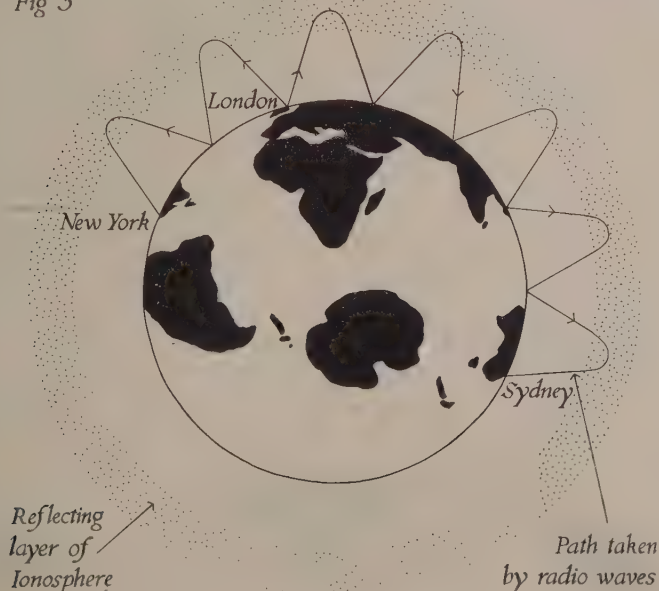
obtained when the highest possible frequency (the M.U.F.) is used, since ionospheric absorption is then at a minimum.

Between the limit of the ground wave and the nearest downcoming sky wave there is a region where no signals, or only scattered ones, can be received, and this area is known as the 'skip' zone.

For high frequency transmission (short wave-lengths) it is possible to construct directive aerial systems that concentrate the radiated waves into a narrow beam in the desired direction, in a manner somewhat similar to the focusing of a searchlight beam. Thus, stronger signals can be obtained at the receiving point for the same transmitter power. At the receiver similar aerials can be used to discriminate against atmospheric noise coming in from various directions.

Sky waves are transmitted to long distances by a series of hops or ricochets, the radio waves being reflected alternately at the ionosphere and at the surface of the earth, somewhat as in fig. 3, which illustrates short-wave transmission from London to New York and Sydney. It will be appreciated that at any given time the state of the ionosphere will not be the same everywhere so that for long-distance transmission the first reflection point in the ionosphere may be, say, in daylight, the next in twilight, and the next in darkness; such conditions would occur, for example, at sunrise over the Transatlantic path. In these circumstances a

Fig 3



higher frequency could be used for the first hop than for the second or third, and a higher frequency for the second than for the third. This state of affairs is shown in fig. 4, which also shows the splitting of the F-Layer at sunrise. For the sake of clarity the E-Layer has not been shown on this drawing. In these circumstances the highest frequency that can be used for the whole path is obviously the lowest of the M.U.F.'s of the separate hops. On very long paths, such as those to Australia and New Zealand, one part of the path may be in daylight and the other in darkness, so that the highest frequency that can be used is determined by the M.U.F.'s for the hops in the dark part of the path, but, as indicated above, the low frequencies necessary for transmission over the dark portion will be heavily absorbed in the daylight portion of the path and at times transmission becomes extremely difficult or impossible.

The operating frequency must therefore be chosen to suit the conditions in the ionosphere at the various reflecting points and, in general, three (sometimes more) frequencies are required to maintain 24-hour service; a high frequency for the day, a low one for the night and an intermediate one for twilight conditions at sunrise and sunset. Different sets of frequencies may be required for different seasons and for different phases of the 11-year sunspot cycle. Frequencies about twice as high can be used during a sunspot maximum year, when most spots are observed on the sun, compared with a sunspot minimum year.

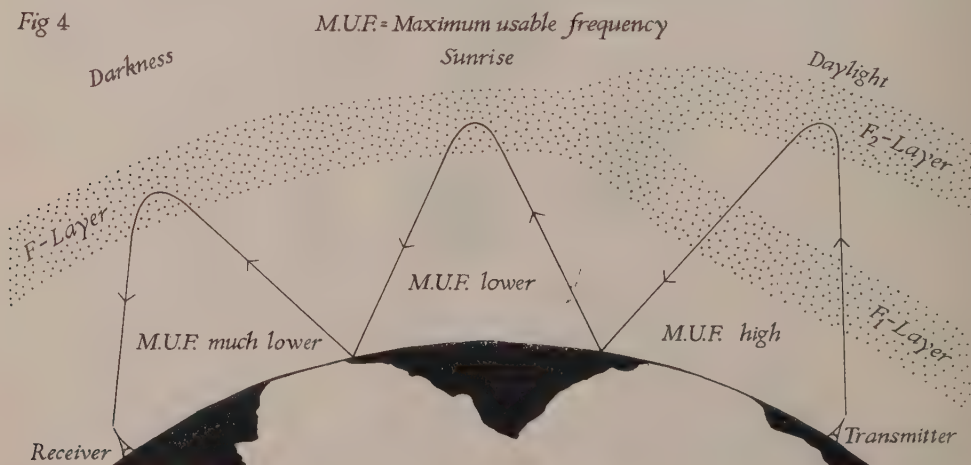
To recapitulate, low frequencies are useful chiefly for short and moderate distances (depending upon the transmitter power available); transmission is mainly by ground wave, it suffers little fading and there is no 'skip' zone.

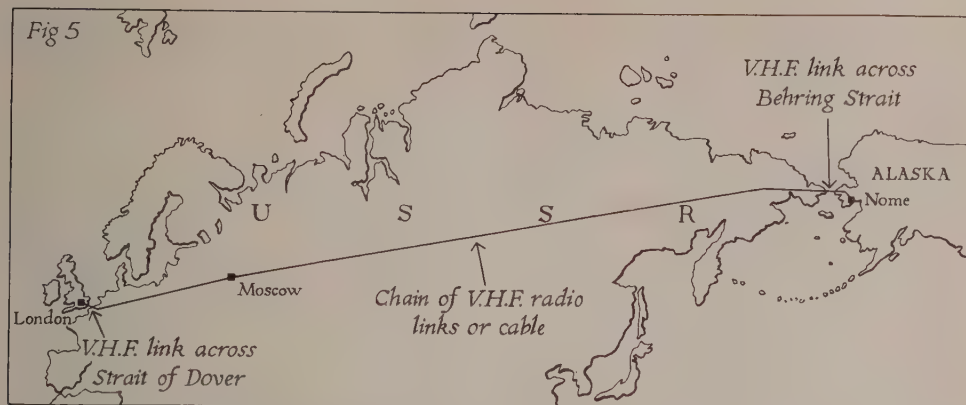
Atmospheric noise, however, is higher and directional aerals cannot be used.

High frequencies are used for long-distance communication by means of the sky waves reflected back to earth by the ionosphere. Provided that frequencies near to the M.U.F. are used, the power required is usually not very great, even for very long distances. High frequency transmission suffers from fading, and there is a 'skip' zone around the transmitter where practically no signals can be received. On the other hand atmospheric noise is less and directive aerals can be used with advantage. The operating frequency must be chosen to suit the ionospheric conditions at the reflecting points, necessitating the provision of several frequencies if transmission is required at all hours of the day and seasons of the year.

It will be recalled that frequencies greater than about 50 Mc/s. are rarely reflected from the ionosphere and transmission on higher frequencies is practically confined to short distances within the line of sight, *e.g.* between two hill-tops. The radio waves do not, in fact, travel in exactly straight lines but are slightly curved downwards due to the changes of air density with height. Under some 'abnormal' atmospheric conditions the ray can be transmitted to exceptionally long distances, though the requisite atmospheric conditions are rare in this country. This aspect of very high frequency transmission was described in the article on *Radar and Weather Forecasting* in the August number.

Propagation on Ultra-High and Super-High frequencies (corresponding to wavelengths of 10-100 and 1-10 centimetres, respectively), presents a new series of problems. At these wave-lengths radio waves





cannot penetrate very far through foliage and vegetation, while transmission through solids such as buildings and the trunks of trees is practically impossible. Such objects cast a radio 'shadow' in which reception is negligible, apart from such signals as may be received by diffraction around the obstruction. At these small wave-lengths it is more than ever necessary to have an unobstructed radio path. At still higher frequencies (wave-lengths of a few millimetres) radio waves are also heavily absorbed by rain, fog and clouds of water vapour and ice crystals.

USE OF VARIOUS FREQUENCY BANDS

Having discussed the various ways in which radio waves of various frequencies are transmitted, we may turn to the particular applications of the different frequency bands.

Low (L.F.) and Very Low Frequencies (V.L.F.) are used mainly for Morse code transmission (telegraphy) over short and moderate distances. It will be recalled that these frequencies are transmitted mainly by the ground wave. In a few special cases where very high power transmitters are employed, signals may be received over exceptionally long distances; *e.g.* the well-known Post Office transmitter, GBR, which operates on 16 Kc/s. (Kilocycles per second), has a coverage that is nearly world-wide. Frequencies at the upper end of the L.F. band (between about 150 and 300 Kc/s.) are used also for broadcasting in temperate latitudes where atmospheric noise is less severe. Transmission on these low frequencies is characterized by its steadiness and freedom from fading and distortion.

Medium frequencies (M.F.), between 300 and 3000 Kc/s., are used mainly for local broadcasting, since with moderate power the ground wave has a useful range of some 100 to 150 miles. These frequencies are also used

for moderate-distance marine communication, ship-to-ship and ship-to-shore; *e.g.* the international distress frequency is 500 Kc/s.

High Frequencies (H.F.), between 3 and 30 Mc/s., are the frequencies used for all long-distance services such as point-to-point telegraph and telephone circuits, marine communication and long-distance broadcasting. In tropical regions, where atmospheric noise is high on lower frequencies, H.F. is also used for local broadcasting.

A NEW USE FOR VERY SHORT WAVES

Very high frequencies (that is, all frequencies above about 30 Mc/s.) are only rarely reflected from the ionosphere and are used mainly for short-distance communication within the line of sight (*e.g.* between hill-tops, aeroplane-to-ground, and 'plane-to-plane'), and for television and radar. In this country frequencies between about 50 and 100 Mc/s. are used for radio circuits linking outlying islands to the mainland, the radio circuit forming a 'link' between the telephone system of the mainland and those of the islands. It is thought that in future these very high frequencies will be more widely applied for communication purposes, since they lend themselves particularly to services such as television and multi-channel telephone operation. There is a possibility that such radio links could be designed to carry some hundreds of separate telephone channels and a network of such links could be set up to carry telephone and telegraph traffic on a scale not previously contemplated. Fig. 5 shows how an overland route from London to North America could thus be provided which, further extended from Alaska to New York, could give a large number of telephone circuits or television transmissions between these two cities.

AN EQUATORIAL GIRDLE?

As I have indicated above, long-distance, short-wave transmission is difficult when there is a considerable variation in ionospheric conditions over the radio path, and, in general, east-west paths are more difficult than north-south. An ingenious scheme has recently been put forward in America, however, whereby these difficulties can be partly overcome. In brief, it has been proposed that a line of radio links might be set up, connecting together about eight relay stations more or less evenly spaced around the equatorial zone. Communication between any two points in the world would then be established by radio links, in approximately north-south directions, between the two points and their nearest equatorial relay stations, with connecting links along the equatorial line. By this means, communication over each individual link would be somewhat easier because of the smaller variation in ionospheric conditions along the radio path. This would result from the smaller differences between the latitudes and longitudes of the terminals of each link in the system, corresponding to the differences between temperate and tropical zones and between daylight and darkness. The polar regions, which are frequently subject to ionospheric disturbances, would also be avoided. Such a system, it is claimed, would permit something approaching 24-hour communication between any two centres. On the other hand, it will be appreciated that each complete circuit would comprise three or more radio links, two north-south links and one or more links along the equatorial line. Each link would require a set of frequency allocations and therefore about three times as many frequencies would probably be required compared with those necessary for direct point-to-point communication. Furthermore, somewhat lower frequencies would be required for the shorter north-south links for getting into, and out of, the equatorial line, thus making the congestion at the lower end of the H.F. band even more acute. On these grounds it appears that, at present, such a scheme would be difficult to implement on account of the acute shortage of frequencies, but I have taken this opportunity of describing it since it has a direct bearing on the vexed questions concerning the sharing of frequencies and may become important in the future.

INTERNATIONAL ALLOCATION

With the intriguing possibilities of expanding radio that can now be foreseen, it is not

difficult to understand that there is keen competition amongst existing and potential users for exclusive rights to use certain bands of frequencies. Radio waves recognize no national boundaries and their use must therefore be controlled by international agreement. Specific bands of frequencies are allocated to different services; provision has to be made for communications for ships, aeroplanes, long-distance telegraph and telephone services, broadcasting, television, military needs, and many additional requirements due to the growth of aviation and of radio aids to navigation by air and sea. Mobile services, which cannot use fixed cables or land-lines, require preferential treatment in the allocation of radio frequencies. An extract from the present international agreement on radio frequencies will indicate how these divisions are made.

Frequencies: Kilocycles per second	Wave-lengths: metres	Services General Allocation
13,350-14,000	22.47-21.43	Fixed Station (<i>i.e.</i> Point-to-point)
14,000-14,400	21.43-20.83	Amateurs
14,400-15,100	20.83-19.87	Fixed Station
15,100-15,350	19.87-19.54	Broadcasting
15,350-16,400	19.54-18.29	Fixed Station
16,400-17,100	18.29-17.54	Mobile Services
17,100-17,750	17.54-16.90	Fixed Station, Mobile Services
17,750-17,850	16.90-16.81	Broadcasting

The allocation of radio frequencies to the various types of service must be subject to full international discussion and agreement; and steps are now being taken to call a world conference to make the adjustments to the frequency allocation table that have become necessary as a result of the great strides made in technique and the new applications of radar during the war. To this end, preliminary discussions have recently been held in Moscow between China, France, the U.S.A., U.S.S.R. and the United Kingdom. These discussions were exploratory and mainly concerned with the exchanges of views preparatory to a fuller conference to be held, it is hoped, in the early part of 1947. The stimulus which has been applied to all communication services, particularly during the war, has led to great advances in telegraphy and telephony by land-line and submarine cable. The two rival means, radio and line transmission, must be made complementary; together they are spanning the earth in an ever increasingly dense network that only cooperation can render fully effective.

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